

NOVEMBER 1955 2.6

# Business

THE JOURNAL OF MANAGEMENT IN INDUSTRY

**WHAT CAN  
PSYCHOLOGISTS  
do for  
INDUSTRY?**

*See Page 77*



*For new ideas\**

## ON ACTIVE DOCUMENTATION

To spread more essential information, more accurately, to more people — that's the purpose of all business documentation. And the speed with which information spreads is governed by the speed of the copying process. There is a Remington Rand technique that uses original documents to produce quick, accurate, cheap copies in any quantity. It's called Active Documentation.



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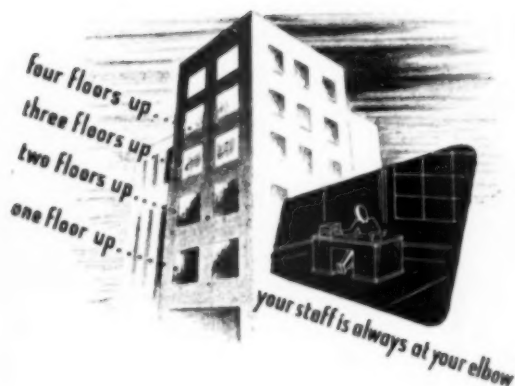
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NOVEMBER, 1955

# Business

THE JOURNAL OF MANAGEMENT IN INDUSTRY

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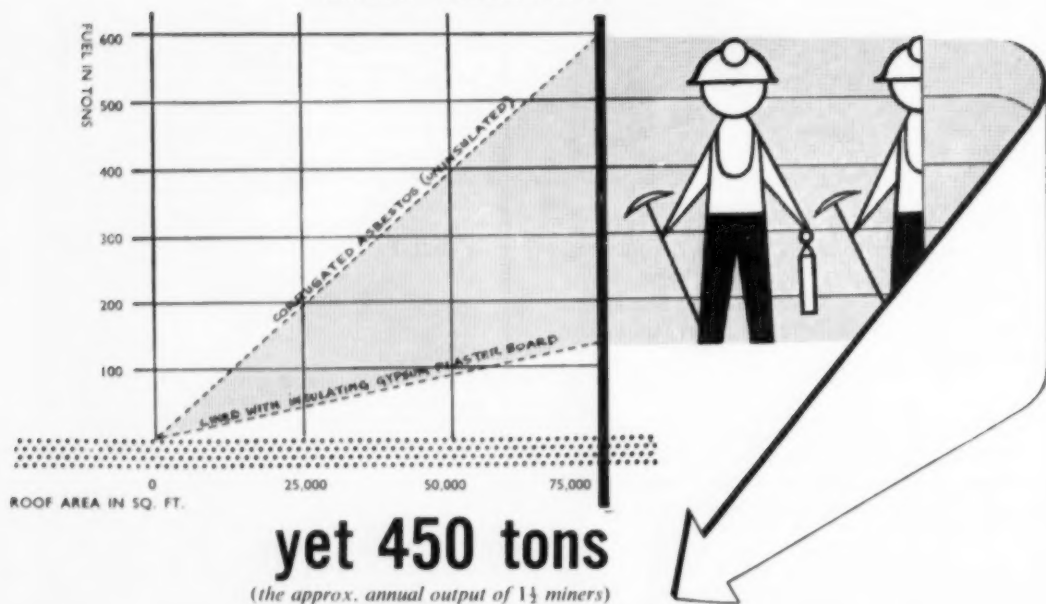
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### NEXT MONTH

#### "Prestige" for your firm

The opening article in the December issue will describe the techniques of leading press and public relations officers in building up the prestige of firms that employ them. This article will be followed by another describing internal publicity methods used in building up confidence and goodwill among employees

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3

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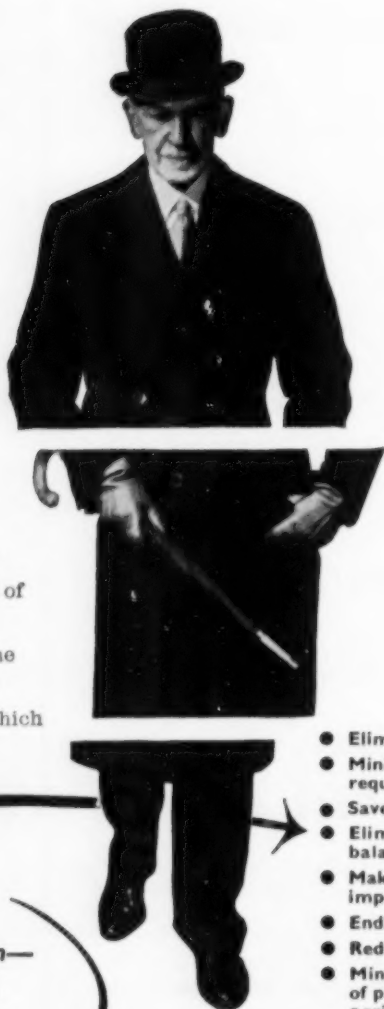
### COVER PICTURE

The progress report on automatic data-processing which begins on page 81 emphasizes that operational experience has proved the reliability of electronic machines. This picture shows one of the processes which helps to ensure reliability—the "ageing" of valves at Mullard Ltd.'s Whyteleafe factory.



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BUSINESS, Vol. 85, No. 11 (incorporating "The Magazine of Commerce," "Modern Business," "System," "Business Organization and Management," "Business News Digest" and "British Industrial Equipment"). Published monthly by Business Publications Ltd., 180 Fleet Street, London, E.C.4. CHAncery 8844. 30/- a year post free U.K. and Eire, 35/- Overseas.

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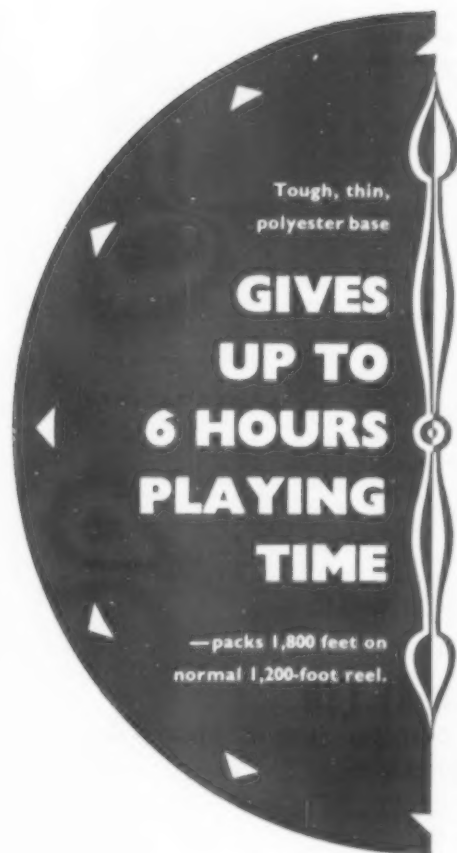
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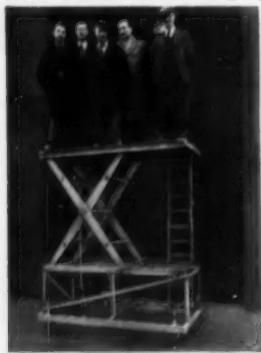
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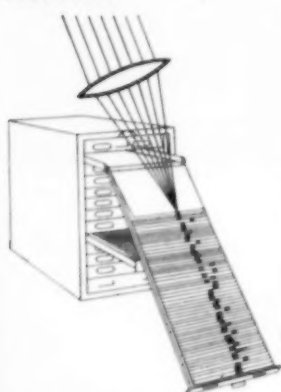
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looks like  
this



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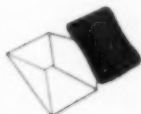
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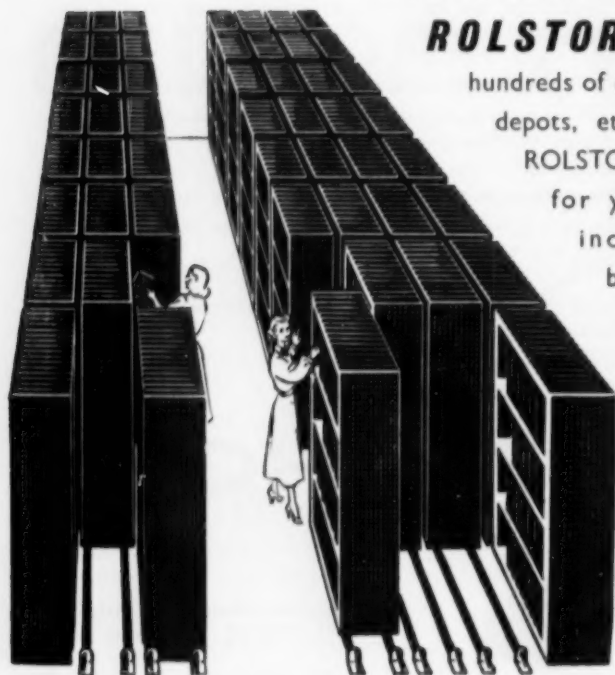
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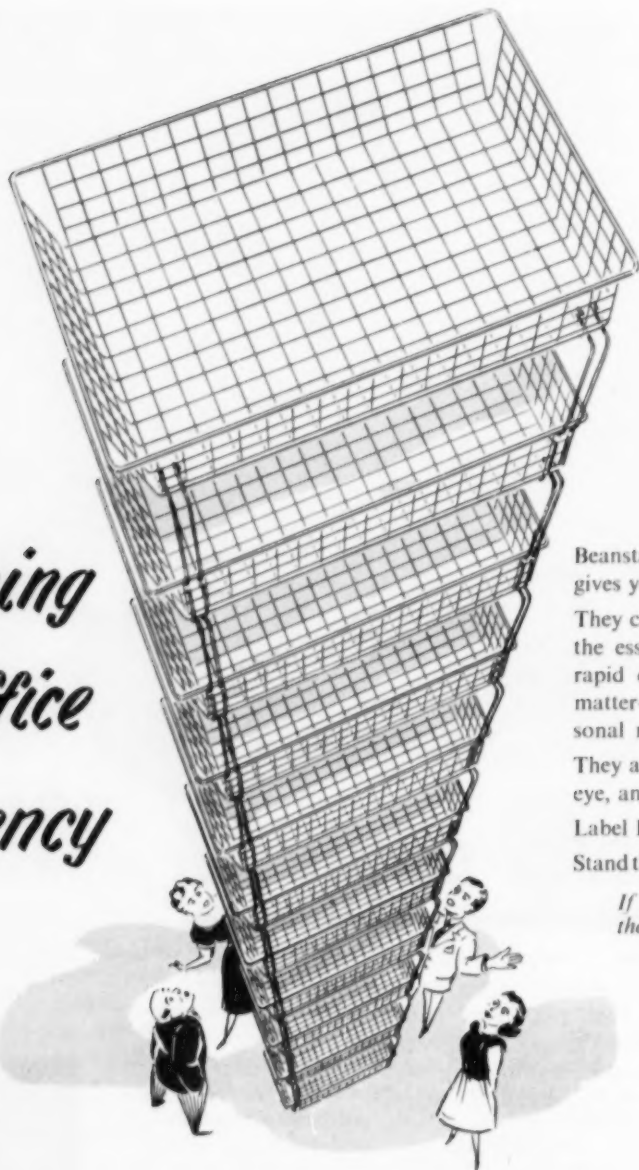


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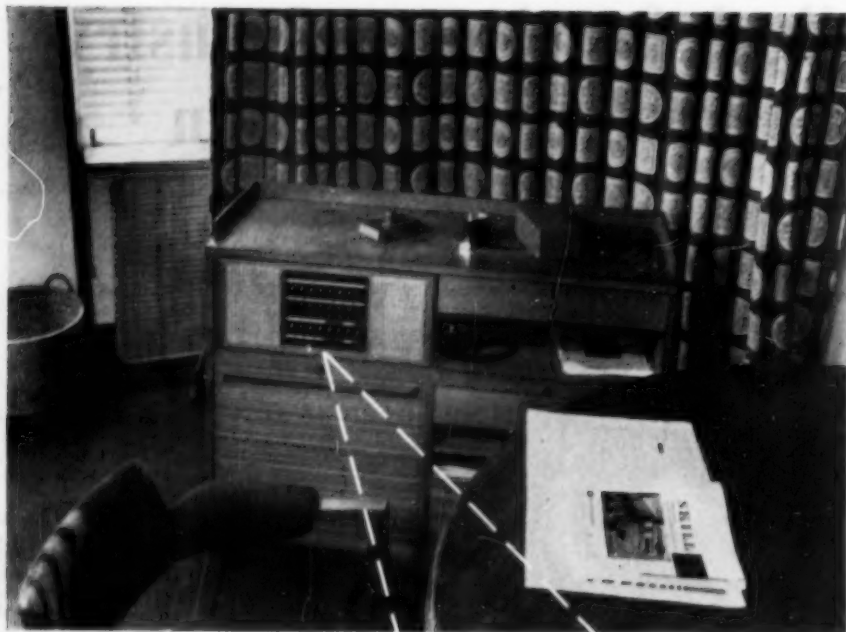
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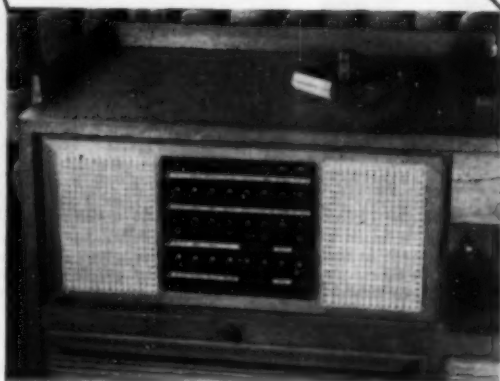


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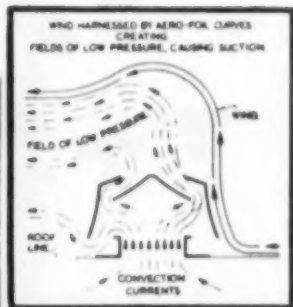
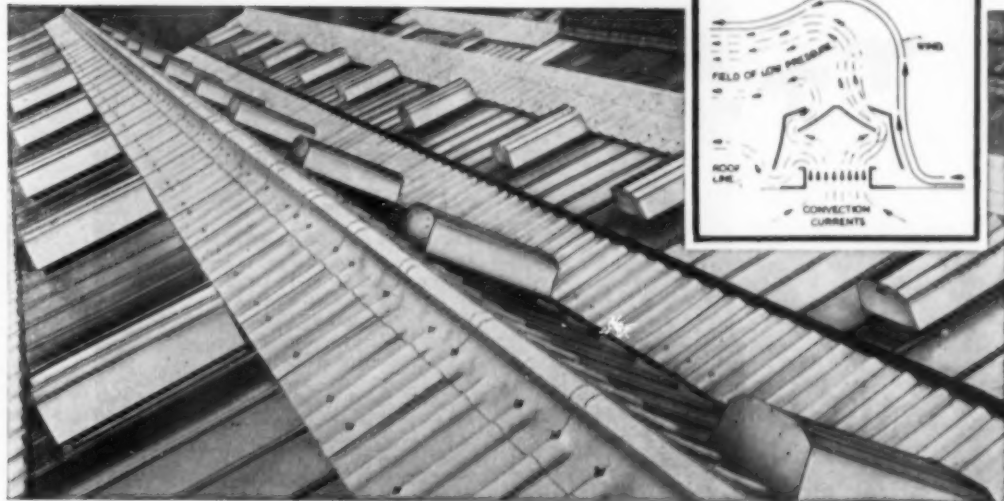




# Colt planning overcomes heat gains . . . at DRUMMOND BROS.

*new Guildford extension*

*Architects: Brownrigg & Turner, B.A. A/RIBA  
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Drummond Brothers, the well known machine tool manufacturers, were building a new extension at Guildford. In designing the Building the Architects were anxious that satisfactory working conditions would prevail at all times despite a considerable heat gain from plant and human occupancy. Furthermore, the process required a light shop necessitating considerable areas of roof glazing which, during the summer months, would add considerably to the heat gains owing to solar heat transfer.

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not more than 10°F at working level during the warmest summer weather. This was achieved by installing 50 Colt SRC.2046 controllable High Duty Roof Extractor Ventilators. The photograph shows the inconspicuous nature of the ventilators which are easily fixed into the glazing bars.

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NOVEMBER, 1955

19



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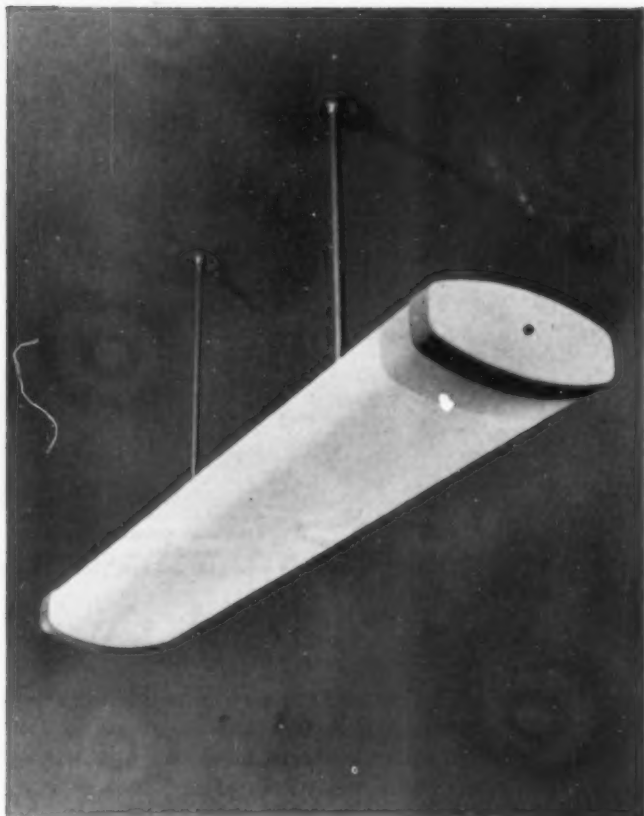
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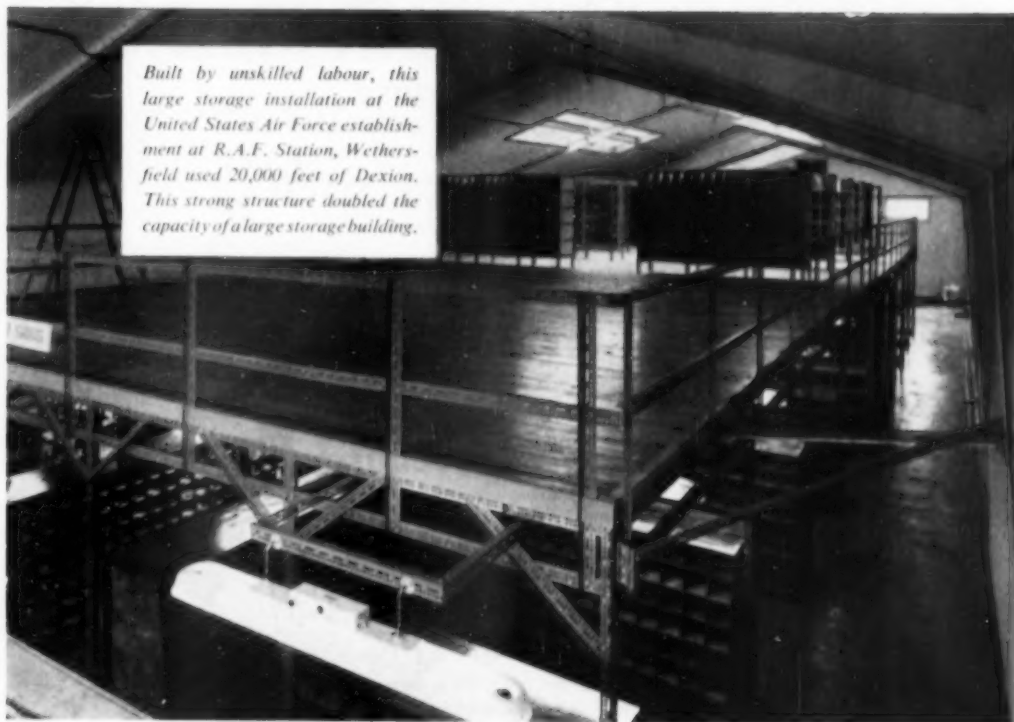


## GET THE FACTS

Dexion 225 is sold in packets of ten 10-ft. lengths, complete with bolts. Steel Dexion (price from 1/3 to 1/5 per foot) is rust-protected, stove-enamelled. Where a light but strong, non-magnetic, non-corroding material is required, use Alloy Dexion (full technical details and prices on request).



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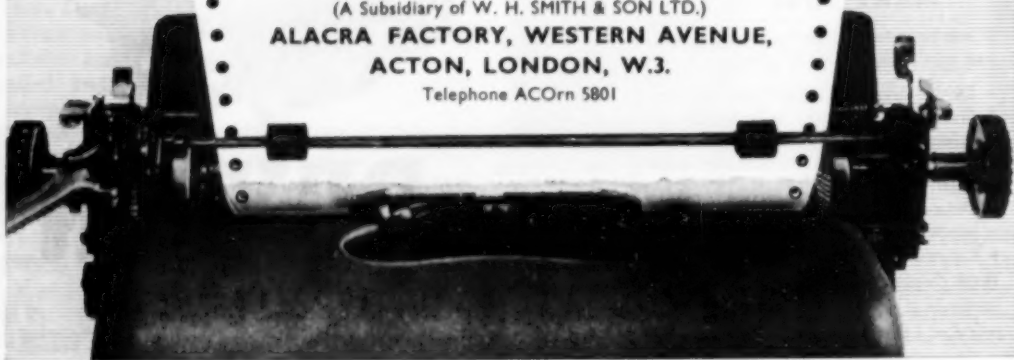
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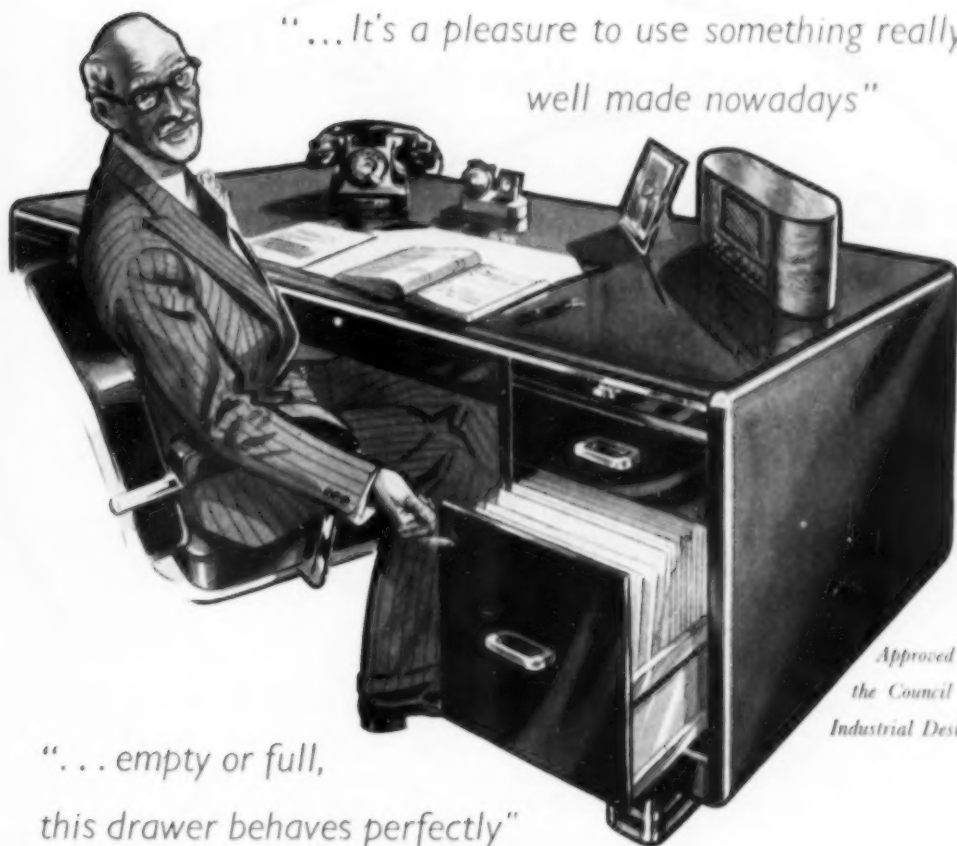
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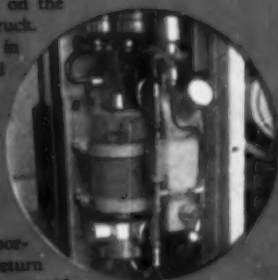


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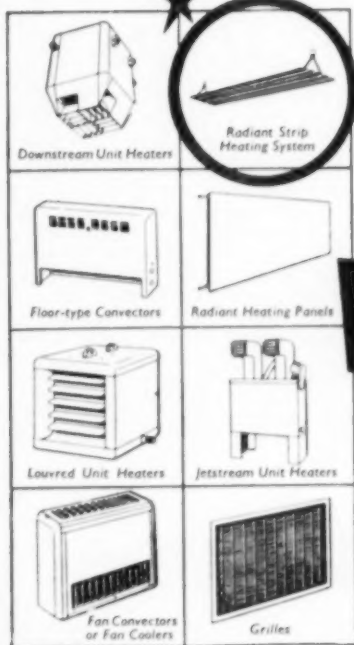
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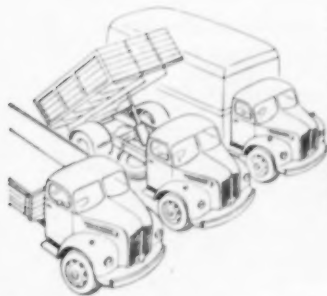
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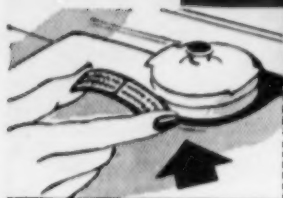
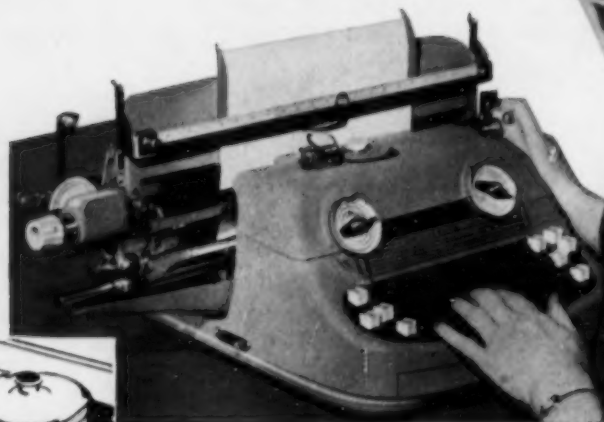
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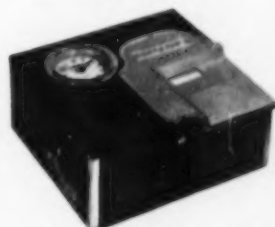
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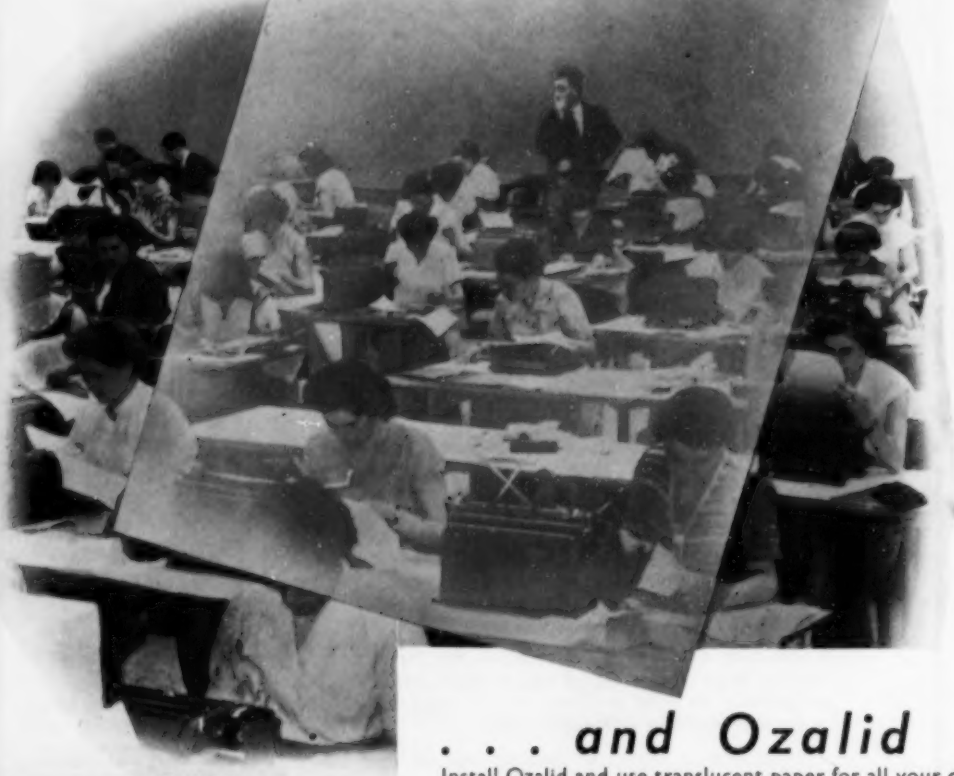
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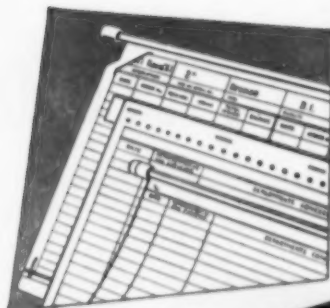
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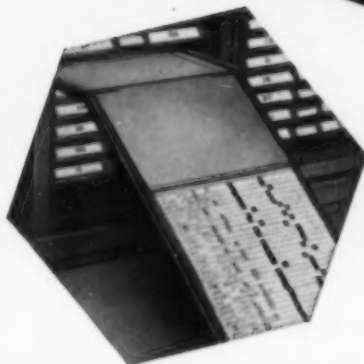
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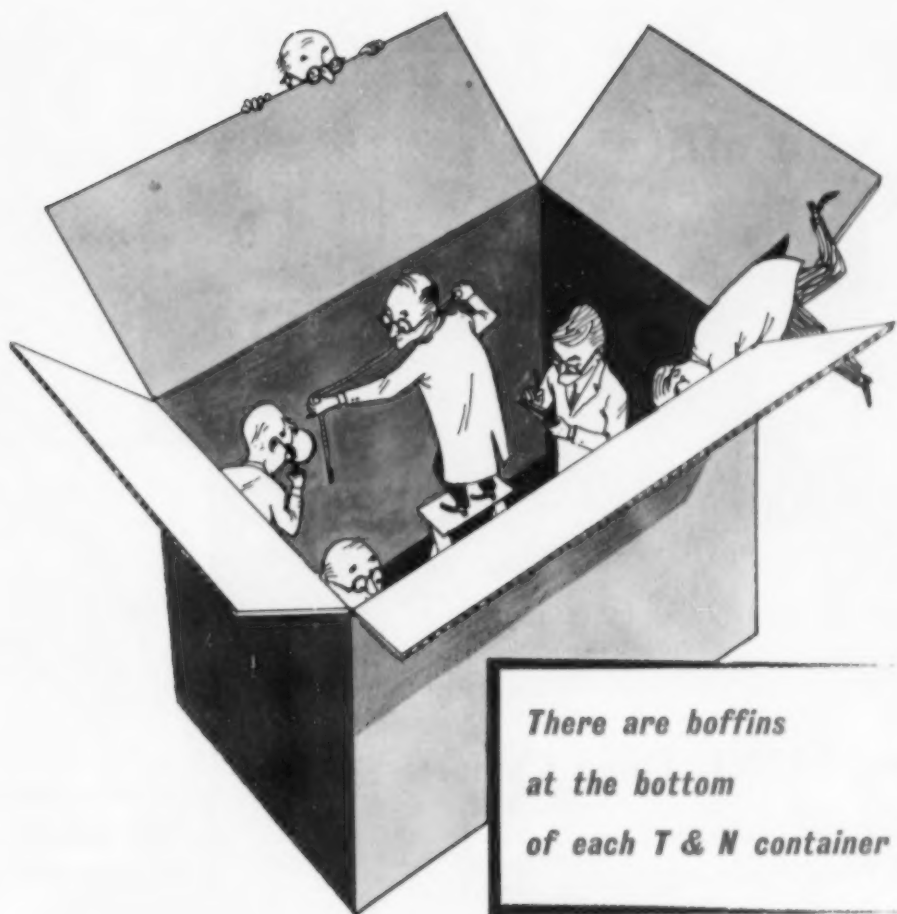
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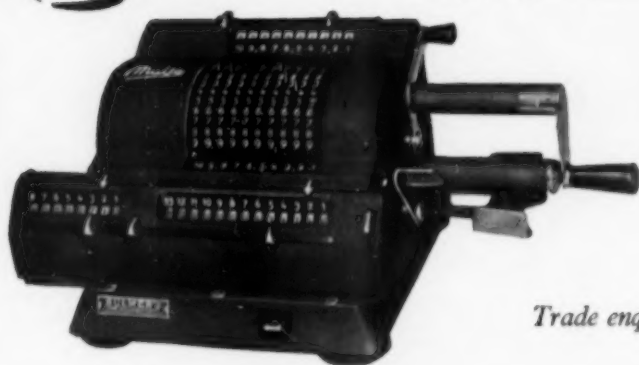
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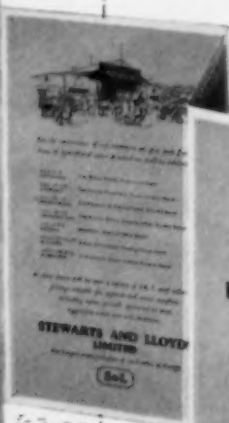
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### Ethics of Restrictions

London, October 21, 1955

#### THE MONTH'S HIGHLIGHTS AND TRENDS

● The introduction of an autumn Budget is an admission by the Government that Bank Rate, the credit squeeze and hire purchase restrictions were alone not enough to curb inflation. (In a monthly journal these words must, perforce, be written before details of the Budget are available). But the failure of credit restrictions to complete the whole job is not the only point worth noting.

● The principles behind the credit squeeze were clearly called in question at the dinner given by the Society of Motor Manufacturers and Traders on the eve of the recent Motor Show. Dr. Llewellyn Smith, president of the society, pointed out that "in inflationary times such as today, the Government naturally consider steps to curb spending at home. When a high overhead industry like the motor trade is involved, this medicine might well prove to be more damaging than the disease." Although Dr. Llewellyn Smith was referring to the possibility of higher purchase tax, what he said also applies to the credit squeeze.

● There is evidence that the credit squeeze is now affecting a considerable number of industries. The present Government prefer to use the credit squeeze to control inflation, rather than use the former Socialist Government's system of direct restrictions. The former policy of "The Gentlemen in Whitehall know best" has been abandoned in favour of a policy: "The Gentlemen in Whitehall are passing the buck to the bankers."

● This policy has had an initial favourable appeal, for businessmen are quite certain that the gentlemen in Whitehall do not know best. But as time goes on, and the effects of the credit squeeze become more apparent, both the bankers and the businessmen are beginning to wonder whether the bankers know any better than the gentlemen in Whitehall.

● The credit squeeze is embarrassing to the bank managers who have to operate it, and at the same time have to bear in mind their competitive position vis-a-vis other banks. It is also confusing to businessmen who are asked to cut down their overdrafts but see others carrying on much as before.

● Dr. Llewellyn Smith's reference to the fact that the "medicine might well prove to be more damaging than the disease" puts very aptly the position of the motor industry. Because this is an industry with high overheads, it is easy to make out a case for allowing the industry to expand as fast as possible. For an increase in output means a decrease in unit costs, and therefore rising motor industry output tends to make the motor industry more competitive in overseas markets.

● However, industries with high overheads represent only one case where bankers may feel obliged to consider that the general rule of credit restriction should give way to an exception. There are at least six other cases to be considered. Obviously of high priority are industries which, by expansion, could further contribute to our export trade. But within this particular case, it is possible to distinguish between industries with a low "conversion value" and industries with a high conversion value. That is, between those which require a lot of raw materials but add relatively little value, and on the other hand industries such as watchmaking, which use relatively little in the way of raw materials, but add a lot of value.

● Another possible criterion distinguishes between essential industries and luxury industries. But here, as in other cases, the banker has to act on behalf of the gentlemen in Whitehall, and know what is good for people.

### THE MONTH'S HIGHLIGHTS AND TRENDS (continued)

● Another case which must be considered by the bankers is that of the basic industries. One has only to plot the rate of growth of the economy in post-war years against the rate of growth of some of our basic industries to find that, in spite of the progress these industries have made, they are still lagging behind demand for their services. The steel industry is an example.

● Another case is that of an industry needing reconstruction. Take, for example, cotton. But the industries needing salvation are not necessarily the most profitable, and most secure, from the banker's point of view.

● Thus it appears that there are several special criteria by which bankers must judge their customers, in addition to the older and more usual ones—namely, the profitability of the business, the degree of security and the likely future importance of the customer to the bank.

● All these points have been set out in detail because most of them are relatively new to both bankers and businessmen. They did not arise in the same way before the war, when "credit restriction" meant simply that the banks, in their own defence, to improve liquidity ratios, were tough with their customers. Now they are not acting in self-defence—their liquidity ratios are all right. They are acting at the request of the Chancellor of the Exchequer.

● The future prospects of any particular industry are affected by the manner in which credit restrictions are applied to it, and by the principles evolved for applying restrictions. This problem has not yet been thought out clearly, but it will loom larger and larger in the minds of British economists, bankers and businessmen, if we are to continue having the twin satisfactions of a high level of employment and an adequate balance of payments.

● The shape of the recent financial troubles emerges from the following comparison of various key economic statistics for the first eight months of 1953, 1954 and 1955. First, the controversial question of bank advances. These increased by an average of 3 per cent between 1953 and 1954, and by 14½ per cent between 1954 and 1955. Total currency in circulation expanded by 5½ per cent between 1953 and 1954 and by 6½ per cent between 1954 and 1955.

● Industrial production expanded by 7½ per cent between 1953 and 1954, and by 6 per cent between 1954 and 1955. Production of passenger cars increased by 41 per cent between 1953 and 1954 and by a further 9 per cent the following year.

● The value of imports rose by only 2 per cent between 1953 and 1954, by 16 per cent between 1954 and 1955. Conversely, the value of exports rose by 11½ per cent between 1953 and 1954, but by only 2½ per cent between 1954 and 1955.

● Import prices rose by 8 per cent between 1953 and 1954, and by a further 5½ per cent between 1954 and 1955, while export prices rose by only 3 per cent in the first period and 2½ per cent in the second.

● The index of retail sales moved up 5 per cent between 1953 and 1954, and by a further 7 per cent between 1954 and 1955. Retail prices rose by only 1½ per cent in the first of these periods and by 4 per cent in the second. Wage rates rose by 3 per cent in the first period, and 7 per cent in the second.

● The price indices of materials used in non-food manufacturing industry fell by 3½ per cent in the first of these periods, and rose by 6 per cent in the second.

● From these figures it is clear that a small adverse movement in the terms of trade, coinciding with a substantial increase in industrial output and a moderate increase in home consumption, caused a relatively large change in the balance of payments. The economy was caught unprepared, with no thought-out plan for dealing with this situation. Questions which have to be asked and answered are these: What is the maximum rate of expansion which a so delicately poised economy can "digest"? And when excesses have to be damped down—as repeatedly they may have to be—on what principles should restrictions operate?

## SALIENT FIGURES OF THE MONTH

Production index for July (8) was 121, or 15 points below the level in June and 4 points higher than a year earlier. Provisional figure for August was 118-119, which compares favourably with 113 in August, 1954.

Value of exports (22) in September was £243.2 million, or £21 million less than in August and £26.5 million higher than in September, 1954. Imports (20) were £304.2 million in September, which was £38.1 million less than in August, and £18.4 million more than a year earlier.

Registered unemployed (7) in September were 202,000, or 2,000 more than in August and 34,000 less than in September, 1954.

Total employment in manufacturing industry (3) was 9,273,000 in August, or 45,000 more than in July, and 214,000 more than in August, 1954. Employment in the distributive trades (5) was 2,819,000 in August, or 17,000 more than in July, and 50,000 more than a year earlier. The number of miners on the colliery books (6) was 702,000 in August, which was the same as in July, but 4000 fewer than a year earlier.

Retail sales index in August (25) was 125, or 19 below the figure for July, and two points above the level for a year earlier.

Weekly wage index in August (31) was 153, or the same as in July, and 10 points above the level in August, 1954. Retail price index (32) in was 150 September, which was 1 point above August and seven points higher than a year ago.

### 'BUSINESS' INDICES

1. Production (12-month moving average) 1948=100
2. Purchasing Power ... (do.)

### MANPOWER

3. Total manufacturing industries (thousands)
4. Textiles ... (do.)
5. Distributive trades ... (do.)
6. Coal (on colliery books) ... (do.)
7. Registered unemployed (G.B.) (do.)

### PRODUCTION

8. Index of prodn.: total, all inds. 1948=100
9. Coal (average weekly output) (thousand tons)
10. Gas available at gasworks (average weekly output) ... (million therms)
11. Electricity generated (month) (million kWh)
12. Steel ingots and castings (average weekly output) ... (thousand tons)
13. Cotton yarn ... (million lb.)
14. Rayon yarn and staple fibre month) (do.)
15. Worsted yarn ... (do.)
16. Sulphuric acid ... (thousand tons)
17. Passenger cars (av. weekly output) (thousands)
18. Commercial vehicles (av. weekly output) (do.)
19. Permanent houses completed (do.)

### TRADE

20. Value of imports ... (£m)
21. Value of imports, Dollar Area ... (£m)
22. Value of exports ... (£m)
23. Value of exports, Dollar Area ... (£m)
24. Freight train traffic ... (thousand tons)
25. Retail sale index ... 1950=100

### FINANCE

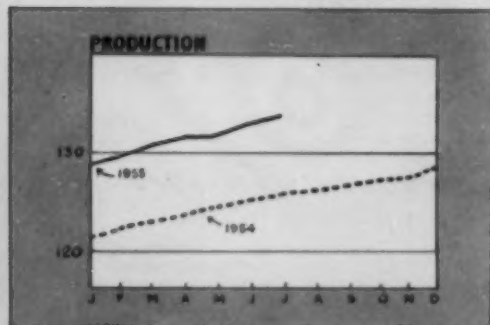
26. Currency in circulation ... (£m)
27. Deposits, London clearing banks ... (£m)
28. Provincial cheque clearings ... (£m)
29. National savings, total outstanding ... (£m)
30. Gold and dollar reserves ... (£m)

### WAGES AND PRICES

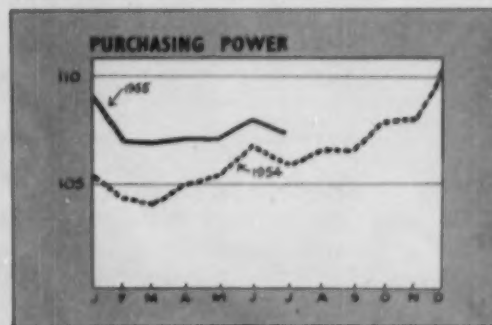
31. Weekly wage rates ... 1947=100
32. Retail prices ... (do.)
33. Price indices of materials used in:
  - Non-food mfg. industry ... 1949=100
  - Mechanical engineering ... (do.)
  - Electrical machinery ... (do.)
  - Building and civil engineering ... (do.)
34. Import prices ... 1952=100
35. Export prices ... (do.)

\* July † September ‡ Four weeks to August 14th, 1955. All other figures refer to August.

	Least Month	Increase (+) or Decrease (-) on	
		Month Ago	Year Ago
1. Production (12-month moving average) 1948=100	* 132.9	+ 0.4	+ 7.7
2. Purchasing Power ... (do.)	* 108.1	- 0.6	+ 1.3
3. Total manufacturing industries (thousands)	9,273	+ 45	+ 214
4. Textiles ... (do.)	954	- 2	- 41
5. Distributive trades ... (do.)	2,819	+ 17	+ 50
6. Coal (on colliery books) ... (do.)	702	Same	- 4
7. Registered unemployed (G.B.) (do.)	† 202	+ 2	- 34
8. Index of prodn.: total, all inds. 1948=100	* 121	- 15	+ 4
9. Coal (average weekly output) (thousand tons)	3,552	+ 143	- 85
10. Gas available at gasworks (average weekly output) ... (million therms)	40.9	- 0.3	- 2.2
11. Electricity generated (month) (million kWh)	5,307	+ 192	+ 279
12. Steel ingots and castings (average weekly output) ... (thousand tons)	345	+ 37	+ 19
13. Cotton yarn ... (million lb.)	* 11.91	- 0.67	- 2.77
14. Rayon yarn and staple fibre month) (do.)	35.41	- 1.3	+ 0.07
15. Worsted yarn ... (do.)	* 16.63	- 2.42	- 1.66
16. Sulphuric acid ... (thousand tons)	* 165.0	- 5.6	+ 3.7
17. Passenger cars (av. weekly output) (thousands)	14.0	+ 0.5	+ 4.2
18. Commercial vehicles (av. weekly output) (do.)	5.6	+ 0.4	+ 2.3
19. Permanent houses completed (do.)	24.83	- 1.47	- 2.63
20. Value of imports ... (£m)	† 304.2	- 38.1	+ 18.4
21. Value of imports, Dollar Area ... (£m)	* 79.0	+ 19.9	+ 25.6
22. Value of exports ... (£m)	† 243.2	- 21.0	+ 26.5
23. Value of exports, Dollar Area ... (£m)	* 35.2	+ 13.3	+ 4.8
24. Freight train traffic ... (thousand tons)	‡ 4.23	- 0.97	+ 0.14
25. Retail sale index ... 1950=100	125	- 19	+ 2
26. Currency in circulation ... (£m)	1,697	- 17	+ 110
27. Deposits, London clearing banks ... (£m)	6,406	Same	- 113
28. Provincial cheque clearings ... (£m)	734	- 66	+ 34
29. National savings, total outstanding ... (£m)	* 6,138	- 13	+ 138
30. Gold and dollar reserves ... (£m)	† 830	- 39	- 199
31. Weekly wage rates ... 1947=100	153	Same	+ 10
32. Retail prices ... (do.)	† 150	+ 1	+ 7
33. Price indices of materials used in:			
Non-food mfg. industry ... 1949=100	† 155.8	- 0.6	+ 12.1
Mechanical engineering ... (do.)	† 175.4	+ 2.0	+ 23.9
Electrical machinery ... (do.)	† 193.6	+ 10.9	+ 32.1
Building and civil engineering ... (do.)	† 139.6	+ 1.0	+ 7.6
34. Import prices ... 1952=100	† 103	+ 1	+ 2
35. Export prices ... (do.)	† 103	+ 1	+ 3



A twelve-month moving average of the Official Index of Industrial Production (Total: All Industries).



An unweighted index of currency in circulation with the public, total bank deposits, and total outstanding national savings.



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## HOME MARKET

## Regional Surveys

★ London and the S.E. ★ Southern ★ South West

## London and S.E.

WITH unemployment at a record low level—under 30,000—output is being generally well maintained throughout the region. A number of industries have been taking on more workers, including those manufacturing electrical machinery, non-ferrous metals, pharmaceutical preparations, metal containers, toys and games, and food, drink and tobacco products.

There has, however, been a slight contraction in general engineering, radio, TV and valves, electrical apparatus and metal goods, while hosiery, leather goods, clothing and furniture are other trades that have shown a downward tendency. The tone of business, though, is buoyant, and attention is being paid by an increasing number of firms to questions of research and development. New schemes, too, are being introduced to cut labour costs.

The effect of measures taken by Hackridge and Hewitt Electric Co. to improve designs and means of manufacture has already been reflected in the company's accounts. Currently further extensions are being made to the factory and new process and test equipment installed to meet changes in technique in the products manufactured.

British Sugar Corporation are another concern who have spent large sums on plant improvement—in the last five years they have allocated £9 million to factory reconstruction—and who are constantly searching for improved methods. Two machines, both invented by one of their employees, have recently been introduced—an automatic sugar packeter and an automatic parcelling machine.

Sims Motor Units Ltd., East Finchley, plan still further expansion of their engineering division and are concentrating their research effort particularly on fuel injection and electrical apparatus to meet the requirements of the small high-speed diesel engines that will come into production in the next few years.

The British Thermostat Co. are dealing with the twin problems of increasing costs and the labour shortage at their Sunbury works by installing more automatic machines and processes and by setting up independent units in districts where workers are available. Latest moves are the purchase of an industrial site at Camberley, Surrey, and the taking on lease of a factory at Ammanford in South Wales.

Increasing the size of staff in the research and development departments is one step now being taken by A. Boake, Roberts and Co. (Holdings), the chemical manufacturers, to speed up the pace of the firm's growth. Others include reorganization of the Stratford factories and the establishment of new plants at Rainham. The company's engineering departments are in process of expansion, as is also the work study department which is devising schemes for both measurement of work and the application of incentive bonus payments.

A new processed food-can factory which is to be built by the Metal Box Co. at Rochester will employ 450-500 people on double shift working. It will have six automatic can-making lines, and more can be added if required. When rebuilt by next spring, the works of Crypto Ltd., on the North Circular Road, London, will have 50 per cent more floor space. The expansion, which includes an additional office block and a new canteen, is being carried out in four phases to avoid interfering with production.

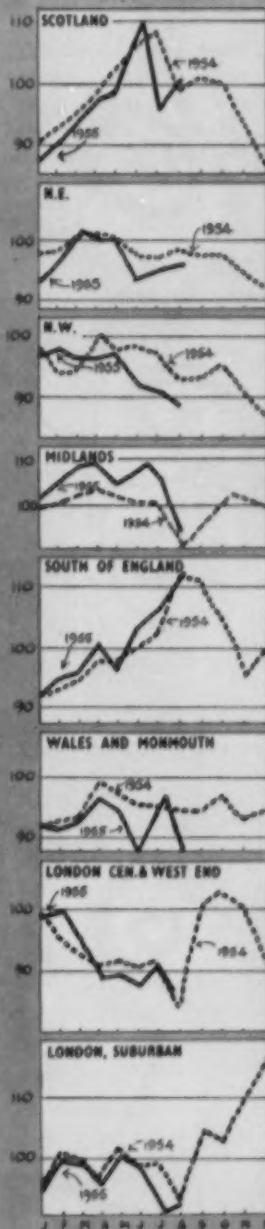
Hills (Patents) Ltd., makers of number plates and signs, have recently modernized their Staines works.

Continued on page 57

## What the Charts Show ➤

Indices in the charts show retail turnover in each region in non-food merchandise as a percentage of national average (=100) for the month. They are based on Board of Trade retail sales indices.

## REGIONAL RETAIL TRADE INDICES

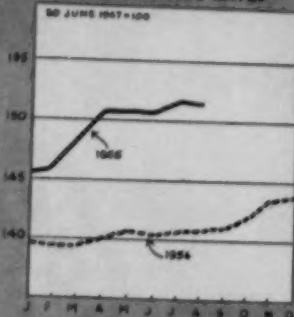


# STATE OF THE NATION

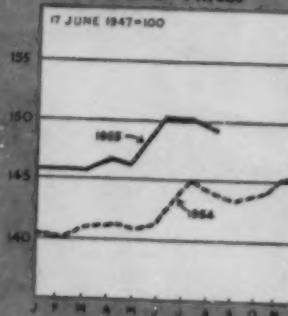
From this comprehensive series of charts, covering the main economic factors affecting the state of the nation the businessman may gain a perspective of the situation governing his operations

## WAGES AND PRICES

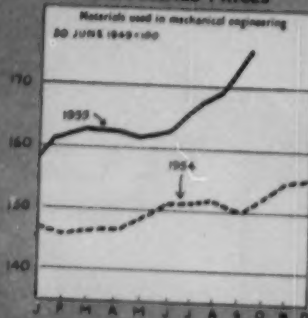
### WEEKLY WAGE RATES



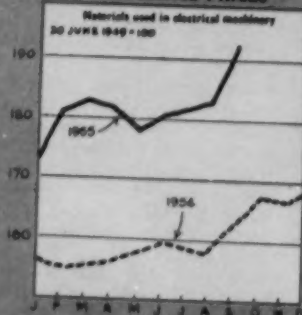
### RETAIL PRICES



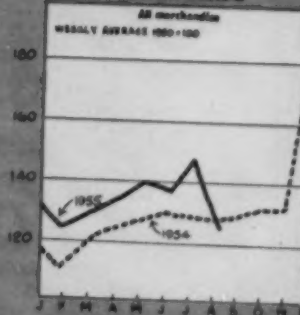
### WHOLESALE PRICES



### WHOLESALE PRICES

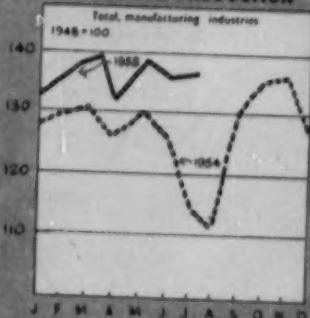


### RETAIL TRADE

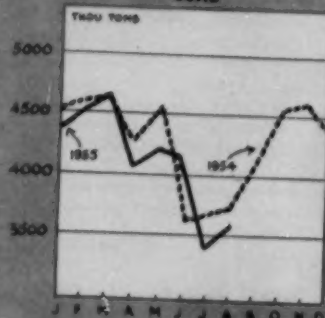


## PRODUCTION

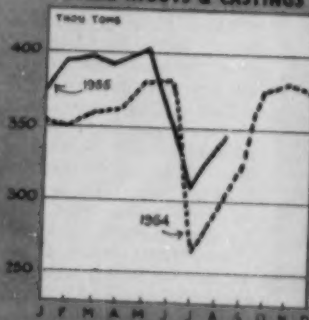
### INDUSTRIAL PRODUCTION



### COAL

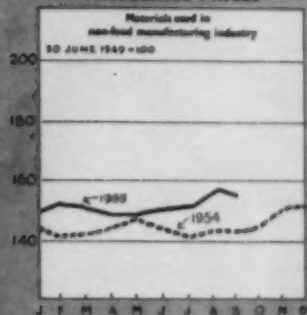


### STEEL INGOTS & CASTINGS

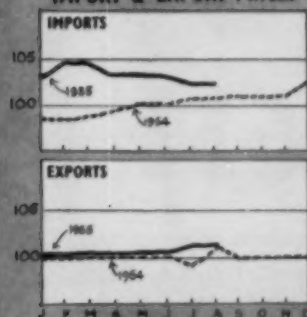




### WHOLESALE PRICES

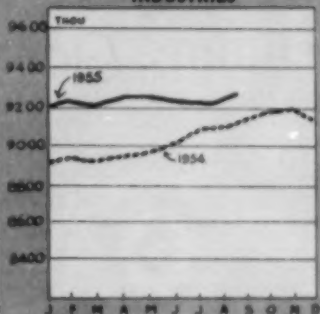


### IMPORT & EXPORT PRICES

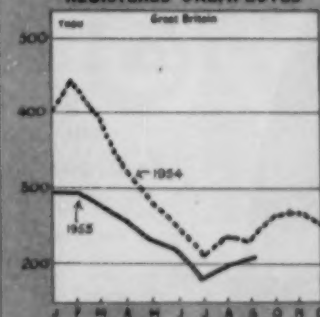


### LABOUR

#### TOTAL MANUFACTURING INDUSTRIES

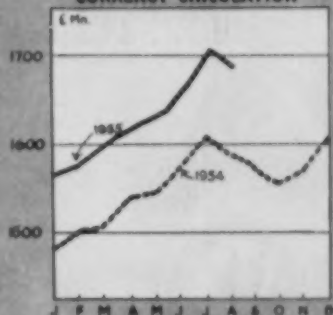


#### REGISTERED UNEMPLOYED

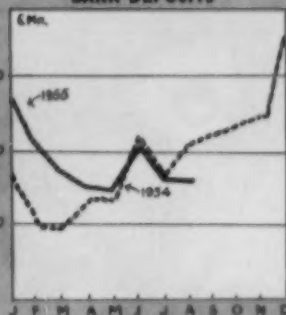


### FINANCE

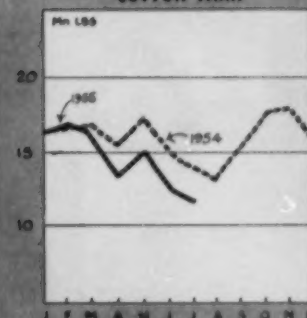
#### CURRENCY CIRCULATION



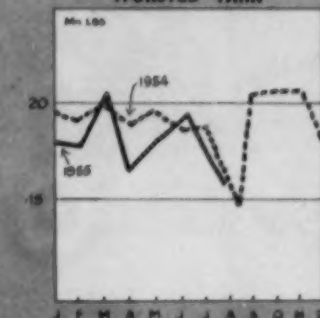
#### BANK DEPOSITS



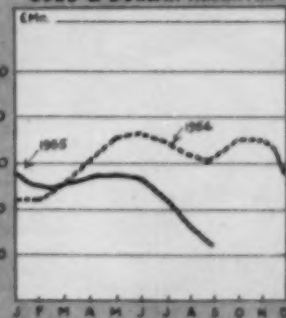
#### COTTON YARN

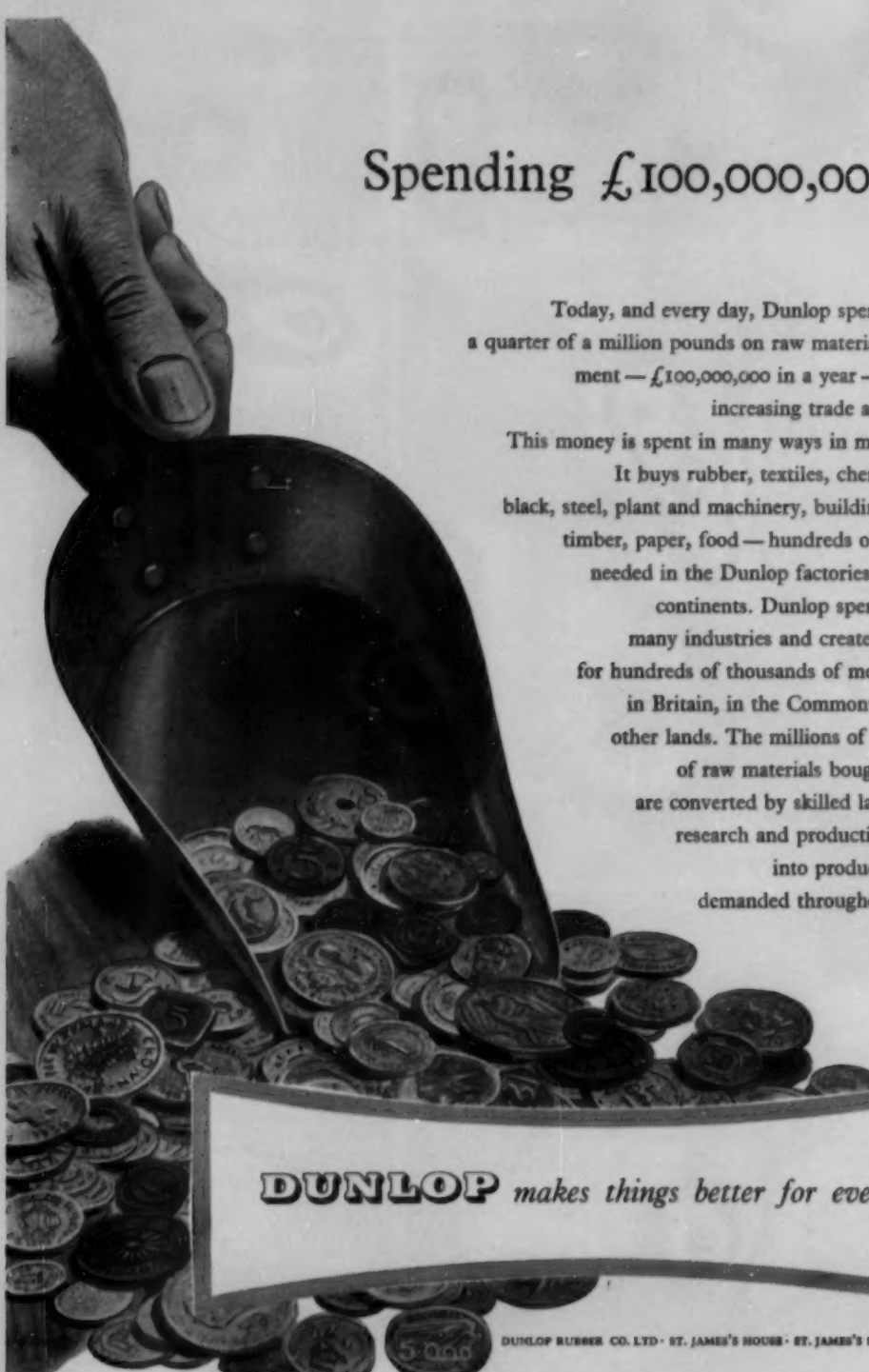


#### WORSTED YARN



#### GOLD & DOLLAR RESERVES



A black and white illustration of a hand holding a funnel, pouring a large quantity of coins into a pile. The coins are of various denominations, including British pounds and shillings. The funnel is dark and has several small rivets. The hand is shown from the side, with the thumb and index finger visible. The coins are scattered around the base of the funnel, creating a large, overflowing pile.

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PAS. 110

## HOME MARKET REGIONAL SURVEYS (cont. from page 53)

Clover Paint and Composition Co., London, are at present expanding their factory buildings and acquiring additional new plant. The joinery works of John Laing and Son (Holdings) Ltd., at Mill Hill, have been reconstructed. A modern factory is being erected at Chertsey by the Amalgamated Dental Co. to replace their Kentish Town premises. The Permutit Co., makers of water-treating equipment, London W., are building a £200,000 engineering plant at Ealing. It is scheduled for completion next March.

Johnson, Matthey and Co., the gold and silver refiners of Hatton Garden, are to transfer to a new site at Royston, Herts., the whole of their chemical work. This will enable not only current work but also new developments to be undertaken, while the company's light engineering work will be expanded at the Hatton Garden premises where the administrative office will remain.

By the end of this year the A.P.V. Co. will have moved the remaining sections of their Wandsworth factory—research, laboratory and office—to their new plant at Crawley, where all manufacturing processes have been in operation since February. The benefit of centralization at the new headquarters has already been seen in the form of better flow of materials and components, improved control and reduced handling costs.

Murex Ltd. are embarking on a three-year programme of capital expenditure, including the expansion of their Waltham Cross research department to undertake work on manufacture and quality of welding electrodes.

To increase output of their products, Powers-Samas Accounting Machines Ltd. have taken over the major portion of the Dartford works of Vickers-Armstrongs Ltd., which they are now extending. Expansion of the company's Croydon works has also been completed.

### Southern

PRODUCTION continues in most industries at full speed, a feature being the development of industries requiring scientists and technicians. Plans have been approved which will treble the size of the electronics industry in which about 30 firms are engaged to some degree. Expansion will take

place chiefly at Southampton, Gosport, Portsmouth, Leigh Park and in the eastern parts of the region. Companies are finding that the task of recruiting and holding technical personnel is simplified if employment can be offered near attractive residential localities, and to attract young technicians some firms plan to co-operate with technical colleges and universities in the area in increasing the scope for scientific education.

Machine tool makers are fully occupied and many have long order books. This industry is one of many that have been showing a marked tendency to expand. Apart from a number of small firms making tools to the order of engineering concerns, there are 15 companies in the region employing some 1,300 workers and manufacturing machine tool products worth more than £5 million a year. A major employer in the region, the aircraft industry has entered into a further phase of expansion and current orders will keep works at maximum production level for some time to come. Sub-contractors, too, are virtually fully employed. A high level of employment is being maintained in the ship-building and ship repairing industries, and in the building and civil engineering trades demands for skilled workers, particularly for carpenters, joiners and bricklayers, are five times as large as the number out of work.

The continued growth of the motor component industry in Southampton, Oxfordshire and East Berkshire is adding to an already considerable labour shortage. As a consequence of the motoring boom many of the principal vehicle distributors are building and equipping new and larger garages and workshops. Home and overseas orders for tractors, trailers, cultivators, milking machinery and poultry appliances are keeping makers of agricultural equipment busy.

Growth of the Fawley oil refinery and of the Berkshire atomic energy establishments is stepping up the pressure of industrial demand for labour. This may intensify. In the Southampton area, which has about 1,000 unemployed at present, new projects already approved or under construction will create more than 4,000 new jobs, while in the Portsmouth and Gosport district, with just over 2,000 unemployed, nearly 6,000 new jobs will be available when new projects reach completion.

Another stage in the expansion programme of Leicester, Lovell and Co., manufacturers of synthetic resin and casein glues, of North Baddesley, Southampton, has been marked by the opening of a new laboratory building. All equipment in the laboratories is self-contained and removable, and they are planned so as to be capable of longitudinal expansion. Vospers Ltd. have opened a new dock at Portsmouth.

To meet rigid specifications for plating demanded by a number of customers, and to reduce high labour costs, the Bifurcated and Tubular Rivet Co., Aylesbury, are completely modernizing their plating shop. They have recently put into operation a new spare parts store. Ultra Electric Ltd. are to build a new 120,000 sq. ft. factory at Gosport for the manufacture of TV and radio receivers. At a total cost of around £1 million, Aspro Ltd. are erecting a new factory and office block on a site on the Bath Road near Slough. The premises should be ready in 18 months.

Now being put up for Borg-Warner Ltd. at Letchworth, Herts., is a £1 million plant for the manufacture of overdrives and automatic transmissions. When completed it will be the largest factory for the production of these lines outside the U.S.; manufacture is scheduled to begin within 12 months.

Esso Petroleum are extending facilities at their Fawley refinery following their agreement with the Central Electricity Authority to supply fuel oil to seven electrical power stations. Total volume of oil to be supplied over a 10-year period is approximately 30 million tons. Storage tank capacity is to be greatly increased, and ship berthing accommodation substantially extended. Additions, too, are to be made to the Esso ocean-going and coastal fleets.

The Southern Gas Board have placed with Woodall-Duckham Construction Co. an order for a new carbonising plant to be built at Cowley New Works, Oxford.

Work on the Herald "workhorse of the air" is proceeding at the Woodley Aerodrome, Reading, factory of Handley Page Ltd. Already overseas orders for this aircraft total more than £4 million, and six have just been ordered by Air Kruis Ltd. Deliveries of production aircraft should begin late in 1957.

Swindon railway works are to build

# PROSPECT survey and forecast of business conditions

25 200 h.p. diesel **shunting engines** for the British Transport Commission. The work, which will be commenced next year, will cover the construction of all mechanical parts and complete erection. The carriage and wagon department is already engaged on the building of multiple unit diesel cars.

Second in a chain of special hotels for motorists planned by Graham Lyon Motels, the New Forest **Motel** at Ower, seven miles from Southampton, has been opened. The company plan six more motels, about 100 miles apart, in the south of England.

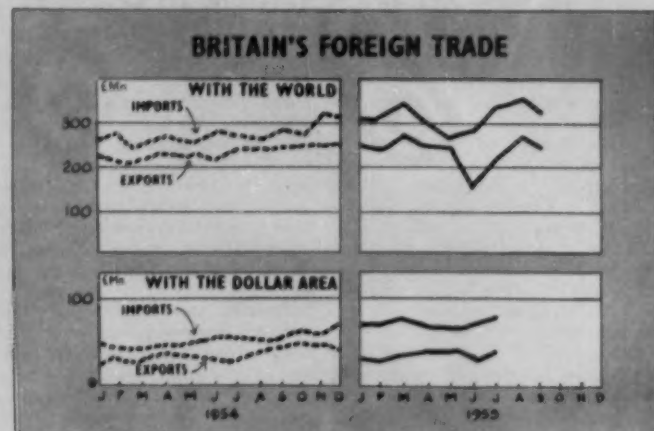
## South West

**I**NDUSTRIAL activity is at a high level and many firms are carrying out re-equipment and expansion programmes. Labour shortage remains a pressing problem. Unemployment in the West Country as a whole is only just over 8,000 and there are currently more than 5,000 vacancies in the Greater Bristol area alone. Skilled fitters and mechanics are hard to find and some companies are engaging women in an effort to expand their labour force.

Steps are being taken to move some of Bristol's industry away from the City: an industrial estate of some 10 acres is being laid out at Yate and up to 3,000 houses are to be provided there and at Chipping Sodbury to attract workers to the area. It would seem that the increasing number of school leavers presents a field of recruitment of which industry should take keen note in the near future, for although in the South West the present average of about 30,000 school leavers a year will rise to almost 50,000 in 1962, a decline will then set in.

**Shipping** traffic through the port of Bristol continues to show a steady rise: for the first eight months of this year total imports and exports handled amounted to 5 million tons, an increase of 16.5 per cent over the corresponding period last year. The Bristol Aeroplane Co., who are making good progress with the Britannia airliner, are planning a gas turbine version of their 173 helicopter capable of carrying up to 27 passengers. They have recently acquired exclusive rights in the Commonwealth for the manufacture and sale of the Solar Aircraft Co's afterburner system.

A new method of controlling internal transport trucks, by which one man at a loudspeaker control can order the movements of vehicles through the



factory, has enabled Bristol's Rodney Works to eliminate inter-shop transport delays and to speed the movement of materials and components. The new system, which was devised by the works' materials handling department, has trebled the utilization of the factory fleet of fork-lift and other trucks.

A new factory for Rocano Ltd., the slotted steel angle manufacturers, of Cherry Lane, Bristol, should be completed before the end of the year. Modern layout will enable production to be increased. The new Warmley plant of Mardon, Son and Hall Ltd., Bristol, employs 200 workpeople in the printing and manufacture of cigarette cartons, and the whole cycle of operations has been designed to give smooth-flowing production with a minimum of handling.

R. A. Lister and Co. have full order books for the range of plant made at their Dursley, Glos., works. Among their latest lines is a portable generating set, weighing only 635 lb. and incorporating a 3 h.p. air-cooled diesel engine.

The British Van Heusen Co. have been making further advances in production and sales. A small new factory unit is operating at Bishops Lydeard, and the acquisition of the West Somerset and Devon Manufacturing Co. with their 50,000 sq. ft. factory at Crewkerne has provided much-needed additional capacity.

To meet expanding home and overseas demand for "Wallpax" finishes and preparatory coatings, Wills's Paints Ltd. have added considerably to the production facilities at their works at Worle, Weston-Super-Mare. The

new extension which the Horstmann Gear Co. have recently added to their Newbridge Works, Bath, is fully air-conditioned, enabling the company's time switches and precision instruments to be assembled under ideal conditions. A specially adapted fluorescent lighting scheme has been installed with pinpoint illumination for small assembly work.

The Poole Pottery of Carter, Stabler and Adams Ltd. is working to capacity despite considerable expansion to meet increasing demand for the firm's domestic earthenware. Latest additions include a new building housing an intermittent twin truck electric kiln for biscuit ware, and a new glaze warehouse.

The introduction by C. W. Pittard and Sons, Yeovil, of washable gloving leathers with a fast-to-washing guarantee has proved most successful, and in the past 12 months the firm have sold sufficient leather to make several million pairs of gloves.

Wiggins, Teape and Co. (1919) Ltd. who have for some time been examining the possibility of producing wood-pulp in England on an economic basis, have decided to erect a pulp mill using primarily home-grown hard woods as the raw material at a site near the entrance to the Severn tunnel, on the north-west side of the river.

A £3.3 million programme of electricity extensions now being undertaken at Berkeley, on the Severn estuary is preparing the way for atomic power. This year's projects, which constitute a record—being nearly 20 per cent more than 1954—will reinforce networks and extend supplies.



## EXPORT MARKET SURVEY—Hong Kong and the Far East

ONE of the finest shopwindows for British goods in the Far East is provided to-day by Hong Kong, that major entrepot centre which has so successfully in the past few years been carving out for itself a new career in manufacturing industry. In 1954, the colony's imports from the U.K. totalled £23 million, and it is estimated that in prosperous times the value could rise to £40 million annually. As in many other markets, however, competitors have not been slow to see the opportunities, and last year Japan, with £29 million worth of goods, took Britain's place as Hong Kong's chief supplier.

The span of years between the Opium War, following which Hong Kong was ceded to Britain, and the Cold War, with its decisive effect on the colony's economy, marks a complete transformation of the territory, only 391 square miles in area. Inhabited in 1842 solely by a few fishermen, stone cutters and farmers, it is now a key centre for world trade supporting a population of 2.3 million. Last year's import of goods totalled £215 million, and about half the tonnage was re-exported.

Hong Kong has grown through exchanging the raw materials of the Far East for the manufactured commodities of Europe and the U.S., and among favourable factors have been its status as a free port, deep water wharves and capacious godowns, stable government, strength of banking and insurance houses and enterprise of merchants.



Their determination and resilience have certainly been tested to the full since the war, for rarely can any market's traditional trading pattern have been more completely redrawn than has Hong Kong's in that short period. Just as Singapore—another major entrepot centre—has been dependent for a large share of its income on Malaya, so Hong Kong has always been closely linked to China's economy. Before the war, that country took about half of the colony's exports and was its main food supplier. Today, Hong Kong's exports are differently disposed.

Although China is still the largest single customer, her share has been

reduced to 16 per cent, while Malaya now takes 14 per cent, Japan 10 per cent, the U.K. and Korea 7 per cent and Thailand 5 per cent. And of the colony's exports themselves, one-third are of local manufactures.

Although shipbuilding and ship-repairing industries have been established since the last century, local production really only got going on any scale in the '30s, when the introduction of Imperial Preference gave firms an opportunity of entering Commonwealth markets.

Industrial production after the war was stimulated by the flight of capital from Shanghai, which financed a considerable amount of development in 1947 and 1948, but the new industries suffered in common with other sectors of the economy when the U.N. embargoes on trade with China were imposed.



High prices for rubber and tin and the lessening of import restrictions in markets such as Indonesia and Thailand have, however, improved the position, and the value of locally manufactured products exported from Hong Kong last year was £42.6 million: main items were textile yarns and fabrics, clothing, fertilizers, footwear and enamelware.

The colony's expansion plans offer openings for a number of British products such as steel tubes, printing and textile machinery, mechanical handling equipment, road construction plant, scientific and medical supplies and building requisites. Production of iron ore in the New Territories on the mainland, which is already being raised to 200,000 tons this year, will be further stepped up to 300,000 tons in 1956. Work is proceeding on the £5 million Tai Lam Chung waterworks project which will add about 20 million gallons a day to the Colony's supply.

The busy Kai Tak airport is to be improved and extended, and local fishing fleets are being mechanized. On the transport side, the China Motor Bus Co. have ordered 17 buses from a British firm. The Hong Kong Electric Co. have given English Electric a £1.5 million contract to manufacture and erect a 30,000 kW steam

turbo-alternator set, and the company are also supplying switchgear and other equipment for a new project designed to meet the increasing demand for power on the island. In the past 12 months, 21 million tons of ocean-going vessels entered and cleared the 17-square-mile harbour which lies, almost landlocked, between the two main cities of Victoria, on the island, and Kowloon, on the mainland. At present the British consulting engineering firm of Mott Hay and Anderson are examining for the Hong Kong Government the feasibility of a cross-harbour vehicular tunnel.

Hong Kong depends for its prosperity on a high level of world trade and particularly on the pace of advance of her South-east Asian neighbours. How are developments going in these territories? Despite political preoccupations, Malaya is tackling a number of major economic projects.

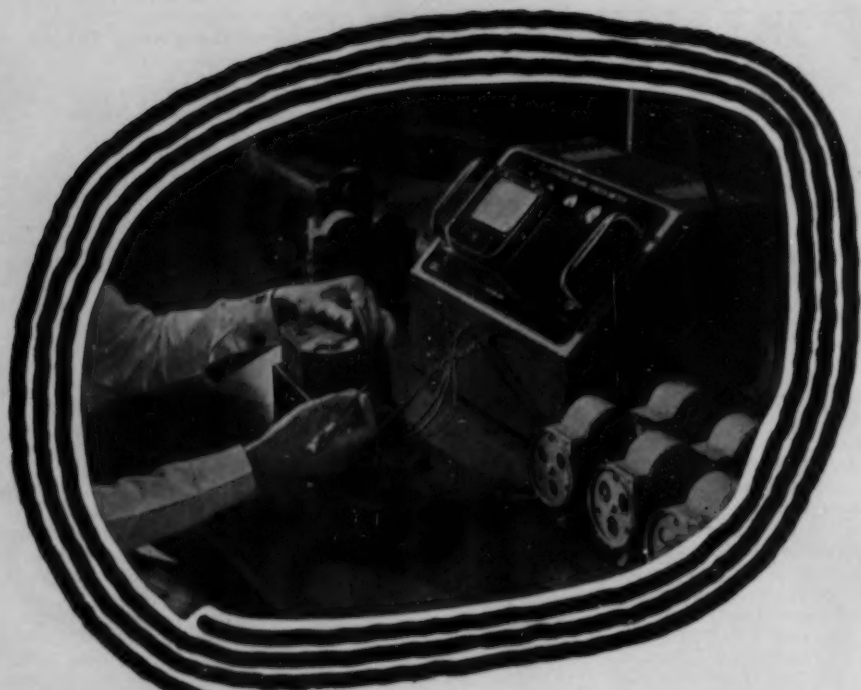
Covering the next five years, a World Bank Mission have prepared a programme of capital expenditure for the Federation involving £90 million. Main aim is to modernize the rubber industry and expand the production of other crops such as cocoa and coconuts. For Singapore, expenditure will total £71 million for public works schemes and the encouragement of secondary industries.



Thailand has benefited from the continuing firm trend of rubber and tin prices, and is anxious to develop her industries, if possible with foreign capital. The State Railways of Thailand have received a £4 million loan from the World Bank to finance part of a five-year investment and improvement programme.

In North Borneo, where since 1949 over £5 million has been spent on reconstruction schemes, a number of development projects are in hand, particularly for drainage and irrigation.

In Brunei, which is now one of the largest oil producers in the sterling area, a show of oil has recently been encountered at Jerudong. Discovered at a comparatively shallow depth, it is the first oil show of promise to be found in the course of post-war exploratory drilling by British Malayan Petroleum Co. in British Borneo.



## Magic Eye

*The product, cine-camera driving motors. The problem, to check the motor speed. But—to check it quickly, accurately, infallibly; with the minimum of mental strain on an operator who is working at high speed. And—a complication: the speed-measuring instrument must not take any power from the camera motor.*

*The answer? A beam of light: interrupted by the shutter on the camera. The magic eye counts the interruptions, electronic gear translates them into r.p.m.—as a direct reading on a dial. Eureka? But electronic speed measuring is*

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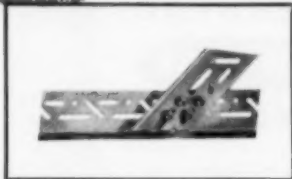
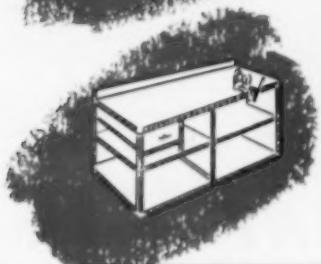
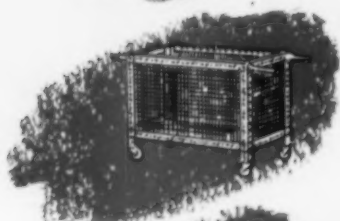
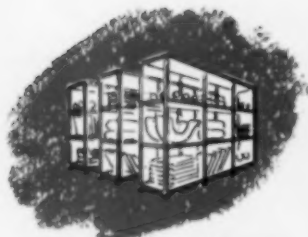
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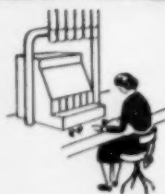
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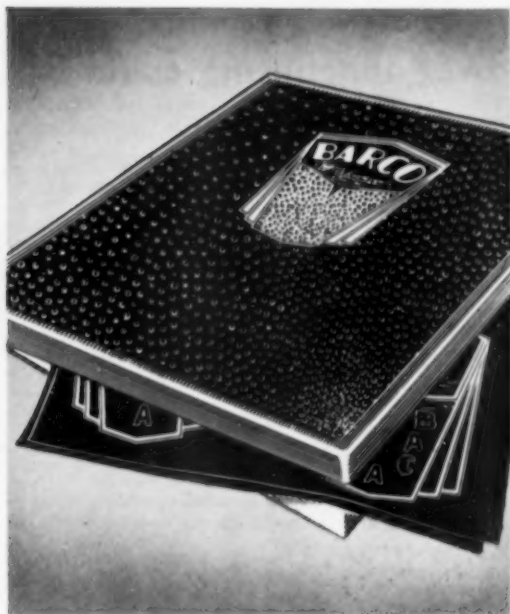
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# COMMENT

## ATTITUDE TO WORK

MANY businessmen will welcome a recommendation put forward in "Citizens of Tomorrow,"\* a study of the influences affecting the upbringing of young people, which has been published by the Council of King George's Jubilee Trust.

A working party set up to study the influence of employment on young people, in the period immediately after leaving school, suggests that more emphasis should be placed, at home and in the school, on preparation for work and the development of a positive attitude towards work.

Industrial experts, trade union officials and educationists, under the chairmanship of Sir Harold West, managing director of Newton Chambers Ltd., call upon the Government to assume responsibility for advising and guiding local education authorities in developing, as a vital part of school life, a realistic concept of work.

They agree with educationists that the overall objective of the school is preparation for "the full life." But they emphasize that the "full life" includes work as well as pleasure; that work is not perforce an unpleasant necessity but an opportunity to make an essential contribution to the health and wealth of the community.

The implementation of this suggestion would entail a radical reorientation of educational policy. But it is likely to find support among personnel managers perennially encountering hedonist youngsters who resent having to work for a living.

\* Odhams, 3s.

★ ★ ★

At a time when the trend of British exports as a whole is giving some cause for concern, the office equipment industry can hardly be said to be lagging. The value of overseas shipments in August was 60 per cent above that for the same month last year.

During the first eight months of this year, the biggest increase was in typewriter shipments, which amounted to £2,399,266, some £295,993 more than in the same period last year. This section of the industry is slightly ahead of the accounting and calculating machinery section whose exports amounted to £2,393,554 in the same period, some £219,577 more than a year earlier.

Shipments of mailing equipment,

cash registers, dictating machines and duplicators, coin counters, etc., were £90,000 better at £2,266,450 (c.f. £2,175,526) and other sundry equipment rose from £1,731,218 to £2,375,885.

During the same period exports of metal office furniture and safes also rose from £2,289,170 to £2,638,853, and of office stationery from £1,904,297 to £2,021,285.

★ ★ ★

## MANAGING YOURSELF

HOW many top executives know how to manage themselves? This was the point of a tribute paid to Sir Miles Thomas, chairman of B.O.A.C., by F. C. Hooper, managing director of Schweppes, at a recent luncheon of the Advertising Association.

Many top men, he said, well fulfilled the triple task of managing the enterprise, the managers and the workers. Sir Miles possessed the fourth ability which was much more unique—he was able to manage himself. Despite his many activities and responsibilities, he always found time to see people and help in every worthwhile cause.

In referring to the "triple task of managing the enterprise, the managers and the workers," Mr. Hooper was adopting the theme of the latest book by Professor Peter F. Drucker on "The Practice of Management."\*

More important, however, than the detailed insight which Mr. Drucker provides into some of the practices of business management, is his general picture of what management involves.

He points out that "the early economist conceived of the business man and his behaviour as purely passive; success in business meant rapid and intelligent adaptation to events occurring outside, in an economy shaped by impersonal, objective forces that were neither controlled by the business man nor influenced by his reaction to them." But today it is clearer than ever that "management is not just a creature of the economy; it is a creator as well. And only to the extent to which it masters the economic circumstances, and alters them by conscious directed action, does it really manage. To manage a business means, therefore, to manage by objectives."

He illustrates this point by quoting from his experience of the build-up of the original Sears, Roebuck mail-order business. This required much more than analysis of the farmer market for retail goods. It "required innovation in five distinct areas."

First, "the finding and developing of sources of supply for the particular goods the farmer needed, in the quality and quantity he needed them and at a price he could pay. . . . Second, it required a mail-order catalogue capable of serving as adequate substitute for the shopping trips to the big city the farmer could not make. For this reason the catalogue had to become a regular publication rather than an announcement of spectacular 'bargains' at irregular intervals."

"Third, the age-old concept of 'caveat emptor' had to be changed to 'caveat vendor'—the meaning of the famous Sears policy of 'your money

\* Heinemann, 25s.



SIR MILES THOMAS—possesses the fourth ability which is much more unique—he is able to manage himself.



WHY IS THE

## Emidicta DICTATION SYSTEM

### SO WIDELY USED ?

**FACT 1** The Emidicta dictation system is specifically designed to speed the work by speeding the letter.

**FACT 2** The Emidicta dictation system includes a concise range of models to meet all normal needs.

**FACT 3** The Emidicta dictation system has been consistently proved a prudent investment, not an expensive luxury.

**FACT 4** The Emidicta among all other dictation machines is notably uncomplicated.



The Emidicta Dictation System is that most often selected by business organisations after careful comparisons, and the roll of notably progressive firms using it is growing daily — a fact which surely speaks for itself.

### BACKGROUND TO A DICTATION SYSTEM

The Emidicta has the finest possible 'sound' pedigree — it is made by E.M.I. ('His Master's Voice', Marconiphone, Columbia, etc.) and is the outcome of half a century's experience in sound recording and reproduction.

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**Emidicta Division** (Dept. 4), "His Master's Voice" Showrooms, 363-367 Oxford Street, London, W.1. Telephone: MAYfair 8597. GROsvenor 7127 & 7128.  
Northern Branch Office: Regent House, Cannon Street, Manchester (Deansgate 2315)  
Also Sales Offices: Birmingham (Midland 5821), Glasgow (Douglas 6061).

E.M.131



back and no questions asked." Fourth, a way had to be found to fill large quantities of customer orders cheaply and quickly. Without the mail-order plant, conduct of the business would have been physically impossible. Finally, a human organization had to be built—and when Sears, Roebuck started to become a business, most of the necessary human skills were not available. There were, for instance, no buyers for this kind of an operation, no accountants versed in the new requirements of inventory control, no artists to illustrate the catalogues, no clerks experienced in the handling of a huge volume of customer orders."

We have quoted this description of the build-up of Sears, Roebuck at some length because it illustrates clearly what the British company director means when he talks about policy.

In Britain the chief duty of a board of directors is the formulation of policy for the firm. This involves something more than just examining the alternative decisions available and laying down rules for the guidance of executives and staff during their day-to-day work. Policy decisions for the most part involve objectives—trying to create something that did not exist before.

This means not merely filling a customer demand. In some cases the demand has even to be created. In most cases the type of organization required to fill the demand has to be created. It is impossible to define the policy of a business firm adequately without bringing in the idea of creation—giving customers something that was not previously available.

Mr. Drucker defines the purpose of a business as "to create a customer." This involves both marketing and innovation. Profit comes from this act of creation—if it is successful, but to define the purpose of a business as "to make a profit" is to miss the essential points about what management does.

★ ★ ★

**THE Town and Country Planning Association** is holding a two-day conference at County Hall, London, commencing on December 1. Subject is "Changing Britain," and object is to consider the effects of the road and railway development plans on the future pattern of industry and population.

★ ★ ★

#### PRICES CUT IN U.S.

**R**ADICAL changes now taking place in American retail distribution are caused by the simple conviction, shared alike by consumers and manufacturers, that retail margins can be brought down. But by far the two most important factors in the fight to reduce margins are: the

NOVEMBER, 1955

## People Products Places-I



**BAKED WHILE YOU WAIT**—To help ensure customer confidence, Nu-Bake Ltd., of Elm Park, Essex, have recently installed a baking unit in their shop premises, so that customers can watch the loaves and cakes being taken direct from the oven. Customers are also invited to walk through the bakehouse and see for themselves the standard of ingredients being used.

#### NEW USE FOR PLASTIC—

Two years of experimental and development work have resulted in this plastic caravan—claimed by the makers, Berkeley Caravans Ltd., to be the first of its kind in the world. The caravan is moulded in two halves and bonded down the centre (thus simplifying assembly and shipping operations) and has exceptional impact strength. Interior wall facings and fixing units are pressed into the body during the moulding.



**EXPORT DRIVE**—In order to speed up deliveries to their European customers, Taylor-Hobson, well-known camera lens manufacturers, are now operating a trans-continental delivery service with their own transport fleet. The van above is seen passing through London on its way to the British Trade Exhibition at Copenhagen.

P.P.P. Continued ►

*but tomorrow  
does come*



Going back into the hustle and bustle of the office will come as a jolt. Clattering typewriters, chattering typists, bellowed telephone conversations, tramping footsteps up and down corridors all day long, the rattle of the tea trolley—how can anyone think, let alone work amid so much noise! Call in Cullum. Cullum will mop up noise for good . . . stop its perpetual tug-of-war with nerves . . . let you hear only what you want to hear. Call in Cullum *now*.

**Sound control by**

**CULLUM**

THE ACOUSTIC CONSULTANTS AND CONTRACTORS

*Concessionaires for*

**ACOUSTI-CELOTEX**



PROGRESS WITH QUIETNESS

HORACE W. CULLUM & CO. LTD., FLOWERS MEWS, LONDON, N.19 Tel: ARC 2662 (4 lines)

abandonment of price-fixing and the expansion of the super market.

Appliance salesmen in the great department store of Marshall Field in Chicago, now carry little black books bearing the current price quotations—quotations that vary as the competition demands. For some months now there have been no price tags on major appliances at the store. According to *Fortune*, "discounting and bargaining are now endemic in the markets of cars, furniture, appliances, home furnishing, toys, cameras, drugs, sporting goods, gasoline and auto accessories; the multiple price system is spreading even to clothing. In markets that account for at least two-fifths of America's annual retail sales of 180 billion dollars, list price is being reduced to little more than a point at which to start bargaining. In this vast area of the U.S. economy, prices have become almost as fluid as in an oriental bazaar."

Originally conceived as "a price smasher" the super market in America can no longer be unique in offering price concessions, since every other retailer is doing the same. Therefore its success now rests on the type of customer services which it is able to offer the American consumer. For the super markets, therefore, the wheel has come full circle—but the operators are still riding high. How the super market began, how it slashed the cost of foodstuffs for the consumer and, now, how it is still expanding within the retail economy is told in detail and with gusto in a new book\* by M. M. Zimmerman, the founder of the Super Market Institute of America and publisher of "Super Market Merchandising," the trade paper of the industry.

\* "The Super Market," by M. M. Zimmerman (McGraw-Hill, 45s.).

★ ★ ★

**A** SURVEY of 953 plants in 11 months, made by the National Industrial Fuel Efficiency Service, showed that nearly 300,000 tons of coal, or 26 per cent of their annual consumption, could be saved. An article on page 86 of the September issue of *BUSINESS* described the services provided by N.I.F.E.S. in helping business firms to cut fuel costs.

★ ★ ★

#### CONTRACTS BY TELEX

**T**HE place where a contract is made is frequently of great legal importance. The Court of Appeal held recently that the general rule that a contract is deemed to have been made where the acceptance is received, applies to contracts made by Telex, and that they are not like postal contracts, which are made where the

NOVEMBER, 1955

## People Products Places-2

### FROM CAMBRIDGE TO CAMBRIDGE—

New director of Oldham & Sons, electrical equipment manufacturers, is 28-year-old Orlando Oldham, whose extensive training in business methods includes study at Jesus College, Cambridge, and at the Harvard Business School in Cambridge, Massachusetts.



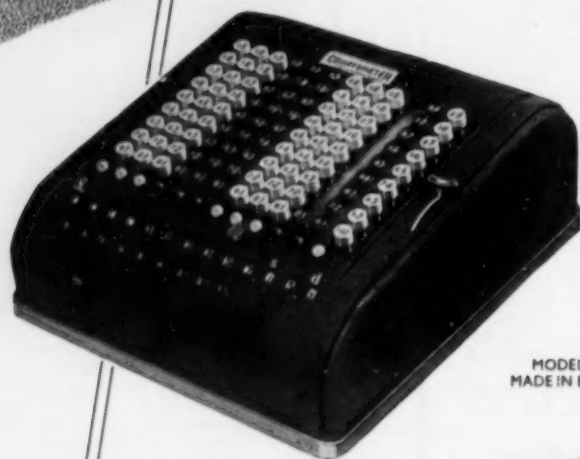
**"NEW LOOK" OFFICES, BRITISH STYLE**—This new wing at the Reigate head office of Crusader Insurance Co. Ltd. shows how the relative narrowness of a room can be minimized by careful use of colour. To emphasize the width of the room, the side walls are a light shade of pink—contrasting sharply with the darker colours at the end of the office—while the ceiling is painted in alternating shades of blue-grey and white.



**"NEW LOOK" OFFICES, U.S. STYLE**—First-class fluorescent lighting, resilient floors and a general atmosphere of brightness and efficiency are just three of the features which make this new Chicago Title & Trust Co. office an outstanding example of modern design. Rather more controversial is the firm's declared intention of providing "background" music as a stimulant to increased output!

P.P.P. Continued

If it's not made  
by Felt & Tarrant  
it's not a  
Comptometer



MODEL 992  
MADE IN BRITAIN

HIGH · SPEED · ELECTRIC ·  
ADDING · & · CALCULATING · MACHINES

THE  
**COMPTOMETER**

Regd. Trade Mark

SALES  
SCHOOLS  
SERVICES

Employment  
Depts. & Training  
Schools in every  
big town

letter is posted. (Entores v. Miles Far East Corporation.)

In Telex communications, which are comparatively new, each company has a teleprinter in its office and a Telex number like a telephone number. When one company wishes to send a message the post office connects the machines and the message is tapped out on the teleprinter at the sending end, just as if it were a typewriter. Instantaneously, the message is passed to the teleprinter at the receiving end, which automatically types the message on to paper.

In this case, Entores Ltd., an English company, were applying to the Court for permission to serve a writ for breach of contract, out of the English jurisdiction, on Miles Far East Corporation, an American Corporation with agents, a Dutch company, at Amsterdam. They justified their application on the ground that the contract was made in England, not Holland. The relevant Telex messages were:

*"Sept. 8, 1954; Dutch Company: 'Offer for account our associates, Miles Far East Corporation, Tokyo, up to 400 tons Japanese cathodes sterling 240 longtons c.i.f. shipment Mitsui Line, September 28 or October 10, payment by letter of credit. Your reply Telex Amsterdam 12174 or phone 31490 before 4 p.m. invited.'"*

*Entores Ltd.: "Accept 100 longtons cathodes Japanese shipment latest October 10 sterling £239. 10. 0. longton, c.i.f. London/Rotterdam payment letter of credit. Please confirm latest to-morrow."*

*Dutch Company: "We received O.K. Thank you."*

The following day there were some further messages about the price, concluding:

*Dutch Company: "Yes, price £239. 10. 0. for longton."*

At that stage there was a completed contract, a Telex offer from England to pay £239. 10. 0. a ton for 100 tons and accepted by Telex from Holland.

The Court said it appeared that in the United States instantaneous communications were treated in the same way as postal communications. The balance of convenience dictated that a contract should be deemed complete when the letter was posted. But there was no need for such a rule where communication was instantaneous, as to all intents and purposes the parties were in each others' presence.

Accordingly, the contract was made in London where the acceptance was received.

★ ★ ★

**A**T the recent opening of the new **ABTH** £8 million turbine factory at **Larne, Northern Ireland**, **Lord Chandos**, the chairman, said: "the capital com-

NOVEMBER, 1955

## People Products Places-3

**CANTEEN WITH A DIFFERENCE** — Clearly illustrating what a little forethought and imagination can do is this ultra-modern canteen, built in the heart of Cardiff's dockland for the British Sailors' Society. The front of the very attractive bar is in veneered walnut.



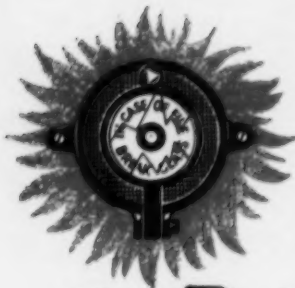
**NEW MARKETS** — Closely associated with Dunlop's plans to expand the sale of their sports goods and flexible plastics in North American markets—in direct competition with American Dunlop—is the recent visit to the U.S.A. and Canada of Frank H. Smith, director and general sales manager of Dunlop Sports Ltd. and Dunlop Special Products Ltd.



**"DON'T FORGET THE DRIVER, SIR!"** — Rootes have taken great pains to ensure that the driver's cabin in their new "Superpoise" trucks compares in comfort with that of the average private vehicle. Among the more notable features is a three-way adjustment of the seat (capable of holding three people), a simple ventilation control and facilities for a radio.

P.P.P. Continued ►





# FIRE!...

... the **TR** **ALARM SYSTEM** pinpoints it  
**IMMEDIATELY**

No limit to the number of alarm points.

Can be linked with an internal telephone system.

General or restricted alarm as required.

The location of outbreak is immediately registered on the Central Indicator Panel.

Installed and maintained on a rental basis.

Maintained at peak of efficiency.

*The installation of TR fire alarm systems conform in all essential details with the recommendations of the British Standard Code of Practice for electrical fire alarms. Special fire alarm installations can be fitted to meet the requirements of Hospitals.*

£26,154,000—Twenty-six million pounds is the cost of damage caused to industrial premises every year through fire—add to this loss of production and plant, and it will be seen that the necessity for an efficient and effective fire alarm system in industrial premises is very real indeed; quite apart from the Factories Act and the accepted responsibilities of employers toward their employees.

An efficient fire alarm system must pinpoint the location of the outbreak and give immediate warning so that the fire can be dealt with promptly before it takes a firm hold. The TR Alarm System—which is available on a rental basis—does this, and because it has to be regularly and efficiently maintained as a part of the rental contract, its ability to be effective at all times can be relied upon.

The long and varied experience of TR Consultants and Engineers in the provision of fire alarm systems is freely at your disposal whether your problem applies to an existing building or one that has only reached the planning stage.

Write to arrange a consultation now—you never know where fire will strike next.

**Telephone Rentals**  
LIMITED  
**OPERATING TR SERVICES**

22 KENT HOUSE, RUTLAND GARDENS,  
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mitment represented by this works is such that we are here to stay. For every man to be employed it has been necessary to find more than £5,000 in cash capital." On the advantages of building factories in Ulster, he said: "Northern Ireland can say to any firm which is thinking of an extension of plant 'You want the best sites, we have them.' There can be no British firm nowadays to whom the prospect of an ample supply of labour would not be a most attractive prospect, and there are many who would appreciate and benefit from the capital facilities offered."

★ ★ ★

#### FORM DESIGN

THE increasing use of paper forms suggests that future historians will refer to the present as "the paper age." However, the contempt which surrounds the filling up of forms tends to obscure the fact that, as pointed out in a new Office Management Association booklet on "Form Design,"\* no one has yet discovered a better all-round way of recording and communicating the mass of vital information required for business purposes than to put it on paper.

This booklet, prepared by an organization and methods study group of the O.M.A., establishes a guiding principle—if you must have forms, make sure they are properly designed for the purpose. The committee who prepared the book firmly believe that in most cases the cost of completing and using the form is far greater than the cost of the original printing—a point to be considered by all who are seeking economy in administration.

Appearance is most important, states the booklet. When careful thought has been given both to the layout and the reproduction of a form, operators will complete it with much greater interest and appreciation than if the design is slovenly and ill-considered. A well-contrived and attractive form stimulates the user to make entries of the same high standard, while an indifferent form is likely to lead to indifferent entries.

\*O.M.A., 58 Victoria Street, S.W.1., price 6s.

★ ★ ★

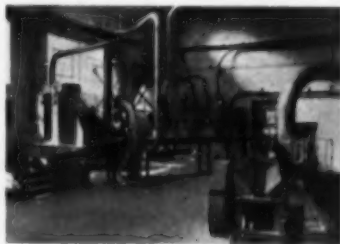
A SAMPLE taken from firms represented in the membership of the Purchasing Officers Association showed that, when members put in orders for supplies, 53 per cent of the original delivery date promises given by the suppliers were not kept, and 39 per cent of the revised promises of delivery also failed. In revealing these facts at the Association's recent annual conference, the president, F. J. White, said: "This shows either a shocking optimism in making original promises or a state of indifference and inefficiency."

NOVEMBER, 1955

## People Products Places-4

#### Focus on a New Factory

THE Scottish Weyroc Company's new plant at Annan, Dumfriesshire, comes the nearest yet to a fully automatic method of converting raw materials into chipboard. Throughout the varied and complex stages of manufacture—peeling, chipping, drying, mixing, etc.—the materials are kept in constant motion. Much has been done to keep labour and space down to a minimum by designing equipment, wherever possible, to perform two or three functions simultaneously. A full-length article, describing Scotland's industrial estates, and the post-war influx of American firms into Scottish industry, can be found on page 85 of this issue.

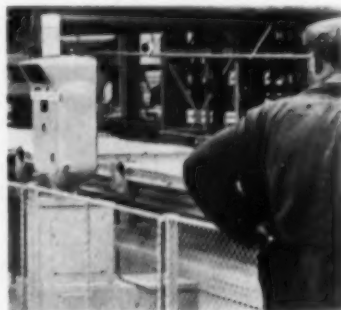


To ensure a continuous inflow of logs, a complex conveyor-belt system has been set up, running between the factory and every part of the log store. As the logs enter the manufacturing section, they are sawn into small pieces then automatically conveyed to the chipping machines.

When the logs have been chipped into particles ("chips"), they are kept in large storage bunkers until required. The chips are then poured into containers, and are mixed with an automatically-controlled amount of resin to form "mattresses." These are then conveyed by belt to be hot-pressed, dried and trimmed into the correct sizes.



After trimming, the mattresses are conveyed to a weighing platform—a form of automatic quality control. A scale lights up on the platform, and a pointer indicates the exact weight of each mattress. When the operator notices that the overall weights are tending towards the set limits, the automatic resin controls are adjusted so that either more or less resin is added.



# IN AND OUT THE MODERN OFFICE..

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there is a saving of ONE HOUR IN EVERY THREE on invoicing, works orders, goods received notes, purchase orders, and other tasks of a repetitive nature.

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## *these are definitely OUT!*

- Time - wasting and unproductive operations such as interleaving and extracting loose carbon sheets.
- Inserting and aligning separate stationery forms.
- Delays in the distribution of routine records.
- Chances of errors, and variation in copies.



### **PRIMUS STANDARD REGISTER**

For HAND-WRITTEN RECORDS, the Primus Register used in conjunction with Continuous Stationery ensures the same speedy smooth operation, while a copy automatically locked in the machine provides your auditor with a check on each transaction.

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# TALKING POINTS

## Electronics: More Work or Fewer Clerks?

**T**HE special report on pages 81—84 of this issue summarizes recent developments in the production and use of electronic data-processing equipment. It does not answer the question which most businessmen are asking: How much clerical labour is saved by employing these machines?

The omission is intentional. Much has been written in other quarters on the electronics-versus-clerks theme. Many generalizations and dramatically-worded prophecies have been made; many well-meaning (although often contradictory) reassurances have been given. But businessmen are interested in facts—and at present reliable facts are extremely scarce.

None of the large-scale business computing systems has been operating for as long as two years: most of the American installations of this type are in fact less than one year old. Only a limited amount of information has been released concerning the *quantity* of routine office work which they are handling. And—understandably, perhaps, in view of the injudicious manner in which all forms of automation have been publicised—even less information has been released concerning the displacement of clerical labour.

The stock answer is that electronic systems are capable of performing *more and better* work than orthodox business systems. Their real value, it is emphasized, lies in the fact that they provide precise information of the type which cannot be obtained economically—or fast enough—in any other way.

This, of course, is true. One particularly promising activity is the preparation of vital "control" statistics in a matter of hours, rather than of days or weeks. Here, moreover, the computer's "powers of discrimination" may be used for the purpose of picking out variations from agreed standards, thus saving management the work of studying unnecessarily detailed reports.

The American General Electric Company propose to use their *Univac* computing system as a means of sharpening what their senior procedures analyst describes as "one of

management's duller tools"—the efficiency of marketing and distribution arrangements. They look forward to the day when an electronically-produced master plan, combining sales forecasting, budgeting and production control, will enable them to have "the right appliance at the right place at the right price at the lowest possible cost."

Here is an example of the many "uneconomic" jobs which have already been undertaken economically by electronic computers. In the United States, I.B.M. feed their manufacturing programme for 12 months into a 702 data-processing machine, which produces an *exact* schedule in terms of individual components. Owing to the multiplicity of parts in the company's extensive range of machines, this job used to involve a considerable amount of estimation; now wastage is reduced to an absolute minimum.

So the "new jobs and better work" argument is supported in practice—up to a point. At the same time it would be rather naïve to overlook the fact that a business computing system is being used more *profitably* when it takes over the routine work of (say) 100 clerks than it is when it tackles a job which would be regarded as uneconomic if 100 clerks were employed on it.

The labour-saving potential of electronic machines employed on daily or weekly jobs like invoicing, stores accounting, payroll computation and

work scheduling, is obviously enormous. Much time and money is being spent on the development of ancillary equipment which will enable computers to handle vast quantities of business data, and it is reasonable to assume that any firm which installs equipment of this type is going to take full advantage of its capabilities on routine work.

No one suggests—or wants to suggest—that the electronic "evolution" is going to create large-scale unemployment among office workers. On the other hand the use of euphemistic terms like "the elimination of drudgery" and "the release of thousands of employees on to work which is more consistent with their dignity as human beings" should not obscure the fact that future developments are going to reduce substantially the number of clerical jobs.

It is difficult to draw hard-and-fast conclusions from the experience of firms which are already using electronic machines. With only a few exceptions, these machines are of the type which are interpolated at a specific point of an existing system. Thus the savings in labour are marginal, and displaced employees are invariably absorbed through the normal staff wastage in other departments.

The position will change, obviously, as the use of large A-to-Z business computing system gathers momentum. Certainly the stage has been reached when all businessmen should be considering, in realistic terms, the effects on clerical labour. It is essential, moreover, that there should be a frank exchange of operational experience in this respect as well as in others.

Technically, the electronic evolution is taking place very quickly. Management must prepare now to accept the new powers—and the new responsibilities—which it involves.



*Computing services are bringing the advantages of electronic data-processing within the reach of firms whose work does not justify a large installation of their own. Here is a section of I.B.M.'s data-processing centre in New York*

# The machine THAT DOES A complete mechanized accounting job for **£350**



On our special deferred terms you can install this machine immediately for a monthly cost lower than that of one junior clerk.

Write or 'phone for our fully explanatory booklet "Complete Mechanized Accounting for a Capital Outlay of £350", quoting reference, 38/Oc.

Sales & Purchase Ledger Posting

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Stores Recording

Costing and all other Accounting  
Records

## **underwood Sundstrand**

PORTABLE ACCOUNTING MACHINE

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FACTORY: BRIGHTON, SUSSEX. SALES & SERVICE EVERYWHERE



A frequent indication that a factory "needs to see a psychologist" is a high rate of labour turnover. This may be due to bad selection of employees, bad training or "there may be something wrong with the way in which people in the factory behave towards each other." What can psychologists do to help business men solve these problems? This article discusses the progress so far made with "personnel research"—and considers how far psychological testing can be useful to industrial forms both large and small.

# APTITUDES and ATTITUDES

## *What Psychologists Can Do for Industry*

**T**HE industrial psychologist is no witch doctor of the workshop. He does not offer to industry any profound and mysterious ideas on the nature of human existence. What he does offer is a set of precision tools for finding out how and why people behave as they do—how they are affected by their work and by each other. He is concerned with the human problems of management and workers alike.

Anyone can tell a genius from a dullard, but it may take a psychologist to tell the difference between one dullard and another. The psychologist is both a scientist and an engineer. As a scientist he collects and analyses facts about men and their work; as an engineer he builds methods and devices for helping them to improve their work. It can be a mistake to judge him by how right or how wrong his general theories prove to be in particular cases, for of greater importance is how useful his *precision instruments* are in practice. He himself spends much of his time finding out just how useful they are.

Because the psychologist himself devises precise methods of finding out how precise his methods are, he knows roughly how much importance to attach to them. Many of them are straightforward enough to be used by any intelligent person, provided that he does not attach more importance to them than the psychologist does. In Britain, at least, an excess of amateur enthusiasm is not likely to be a danger.

### **The Four Groups**

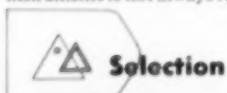
Industrial psychologists may be divided into four main groups. First,

**By GEORGE MACRAE**

there is a small group employed by industrial firms, usually as personnel or training officers. Secondly, there are consultants attached to scientific institutes and private firms of management consultants. Thirdly, probably the largest group, there are research workers sponsored by institutes, universities and the Government. And fourthly there are the psychiatrists,

notably those attached to the Tavistock Institute of Human Relations. It is mainly with the work of the first group that this article will deal. This group not only has an inside knowledge of industrial problems, but many of its methods, both in research and application, can well be adopted by small firms unable to have a psychologist of their own. This article does not deal with vocational guidance, and psychological work in market research, advertising and other activities outside the factory itself.

The subjects into which the article is divided are by no means independent of one another. One of the first jobs a psychologist has to tackle is to decide which of the problems mentioned are in most need of his attention. A frequent indication that a factory "needs to see a psychologist" is a high rate of labour turnover. The cause may be that the wrong people have been taken on in the first place. Or it may be that the right people are being trained in the wrong way, or not trained at all, and are using the wrong methods. Or again, there may be something wrong with the way in which people in the factory behave towards each other. Much of what psychologists do about these problems is familiar enough; but the cautious way in which they use their precision instruments is not always fully realized.



Some firms have such difficulty nowadays in getting labour at all that they may doubt whether elaborate psychological selection procedures will





Photos by courtesy of "TARGET".

*Aptitude tests are often closely related to the job itself. Here a candidate for leather-cutting work has to sort out pieces of material of different thickness and texture by sense of touch alone*

be of much use to them. But it is more sensible to leave a vacancy unfilled than to fill it with somebody who has not sufficient intelligence or ability even to learn the job, let alone learn to do it properly. And this is just the sort of person that the ordinary intelligence and aptitude tests can weed out with reasonable reliability. It is also important to know whether a man who is generally acceptable is better suited for one sort of job than another.

For all kinds of appointments the old familiar "intelligence" test probably remains the most useful. Does it really measure how intelligent people are? It is not always realised how unimportant this question is. If you ask a psychologist what the test measures he will say that he does not know. That is not the point. What does matter is how far people who come out well on the test succeed in particular jobs. What interests the psychologist is the "correlation coefficient" between test results and job success. If the correlation is figure 1, the test is perfect. If it is "0," it is quite useless. A correlation of 0.5 means that the test is reasonably helpful, but needs a good deal of support from other selection procedures.

It follows that selection tests must be thoroughly tested before they are used. This means trying them on new employees who have been selected by other means, and then observing how they succeed.

For research purposes all the data have to be taken into account, but in practice, it is not usually so important to know whether those who do best in the test do best in the job, as to observe how those who do badly in the test get on. In other words, the intelligence test is often most useful as a

rejection instrument. For instance, one factory has found that anyone can do a certain mechanical job except those in the bottom 10 per cent in the test scores. Another has found that a certain job requires the knowledge of a university graduate, but tests have shown that the work is so dull that no very intelligent graduate would stand it.

Mechanical aptitude tests are probably most useful when they are simply a mock-up of a particular job. Here is an example of how one set of tests was tested.

The basic skills required for a job were studied and nine mock-up tests devised. A group of 20 trained operatives were taken as guinea pigs, and divided into two groups—the best 10 workers, and the rest. Both groups were given the tests, and it was found that eight of the nine tests clearly indicated which was the best group.

The eight successful tests were then given to all new employees after they had been selected, and when a sufficient number of results had been obtained, it was possible to decide what score in the tests indicated probable success or probable failure at the job itself.

The next step was to follow up the actual performance of 33 new employees. It was found that 12 would have been rejected if the tests had been used for selection. Of these 12 the follow-up showed that four failed to learn the job at all, four left the job within three months and four had achieved a low rate of work after two months' practice. Of the 21 who would have passed the tests only two failed to learn the job at all and four left within three months. What was most significant was that not one of the 21 was doing a poor job of work after two months' training. Only after this

research had been carried out were the tests put into practice. And even then they were used as a helpful indication rather than as a perfect means of diagnosis.

Testing of the simple abilities required for simple jobs is one thing. Picking the best men and women for supervisory and executive positions is quite another.

Psychologists are trying to help in two ways. First, by defining more precisely what it is that the job requires in a man, and by making clear to selectors themselves just what it is they are looking for. Second, by training interviewers in the best methods of finding out whether candidates do have the qualities that are being looked for. Third, by developing what are unfortunately known as "personality tests." These are designed to give an objective rating of certain broad aspects of human behaviour.

The first two are a matter of "organized common sense." The psychologist analyses a job, especially by looking for the reasons why people have failed in it in the past. It is much easier to decide the kind of people that you definitely do not want than the kind of people that you do. On the positive side, the psychologist examines the kind of thing which a man must be able to do to succeed. He tries to clear the interviewer's mind of such vague and therefore largely meaningless abstract nouns as "initiative" and "imagination."

Some psychologists believe that the interview is still the best way of assessing personality, provided that the interviewer knows precisely what he is looking for, or, more important, the kind of thing that he definitely does not want. It is, of course, to be remembered that to a large extent "the man makes the job," and that experience of other people in the job may not give a complete indication of how the next man will succeed. A useful guide for interviewers, to help them organize their procedure, is the seven-point plan developed by the National Institute of Industrial Psychology before the war.

Psychologists themselves differ on the value of "group" selection procedures. But "house parties," largely modelled on the War Office and Civil



Service selection procedures, are quite widely used for the selection of management trainees. Candidates are formed into groups of six or eight and are given questions to discuss, and problems to thrash out, in committee. The selectors sit round watching what goes on.

This method is an extension of the interview and the written test. The observers try to see how intolerant candidates are of the views of others, how consistent they are in sticking to their point, how easily they may be swayed, and how good they are at making their view acceptable to the rest. This is really an attempt to produce a "mock-up" of work of an administrative and social kind. It does provide the observers with a more general idea of what a man is like than they can get from looking at him across the table at a normal interview. But even the Civil Service Selection Board, which is of a regular composition and sees a large number of candidates every year, can produce a "coefficient of validity" of only 0.58. This procedure, therefore, is clearly not one which can be just set up now and again when a firm wants to take on some new men.

Perhaps the most controversial kind of selection procedure is that involving personality tests. Different psychologists use different ones, and none of them regards his results with any deep enthusiasm. "Word association" tests, for instance, are treated only as a guide for a subsequent interview. One form is to show the candidates a card with a word written on it. They have to write down either any word or one of four particular words which the word on the card suggests to them. To take an extreme example, if a man writes down "mother" in response to each one of 40 or 50 cards, this suggests that there may be something odd about him which the psychologist should look out for when he comes to interview the man.

There are two main traits which personality tests are used to assess—the degree of stability or neuroticism of the candidate, and also of extraversion or introversion.

The tests being carried out for measurement of these traits are not intended to be used alone. Only when a whole "battery" of tests gives a consistent picture can the results be regarded as useful.

One way of measuring extraversion or introversion is to compare the results of the ordinary non-verbal intelligence test with a test of verbal ability. The introvert tends to have a higher score on verbal ability, the extravert a lower score.

Several methods of measuring the degree of stability or neuroticism are in use. One is the "body sway" test. The candidate stands up and shuts his eyes, and suggestions are made to him that he is falling over. His physical stability under suggestion is taken to indicate his mental stability.

Another way is to use the Rorschach "ink blots." The victim has to look at a set of smudges and write down what he thinks they most resemble. Normally, operators of this test have to undergo a long training to interpret the responses that are made. This test is rarely used in British industry, and then only in modified form. Candidates are asked to choose, between nine given responses to each shape, marking them in order of priority. Four of the responses suggested are those which, from experience, it is known that neurotics generally make. The other five indicate stability.

It is easier to devise and apply such tests than to know what to do with the results when you have got them. In the United States alarm has been expressed that indiscriminate and unintelligent use of personality tests is producing a new breed of dull, mediocre, mildly-extravert business men of cow-like stability.

Much of the driving force in business has obviously come from men with a

certain degree of neurosis, whether introvert or extrovert. It is encouraging that in this country the firms which make the most use of personality tests are most interested in finding which sort of neurosis gets the best results in which sort of job. The Fraser Report estimates that about 30 per cent of all people in British industry are neurotic to some degree, 10 per cent seriously so. An enormous amount of energy is probably going to waste which capable industrial psychologists might very well be able to harness by careful and undogmatic use of personality assessment.

However, there are certain jobs for which it is definitely important to pick stable applicants. Firms which have numbers of responsible posts overseas are notable users of psychological methods. Such jobs generally require a high degree of stability, yet it is often the very unstable who apply for them.



Some early industrial psychologists were less concerned with finding the right men for the job, than with finding the best way of doing the job. More recently, schemes and devices for getting the best work out of people, from time-study and conveyor belts to incentive and merit-rating schemes, have been considered the job of engineers, accountants and other system-minded persons. But now there are signs that the psychologists are coming back and asking some down-to-earth, awkward and revealing questions about these systems.

What they want to know is what are the real effects—and all the effects—of these intricate modern

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*An eye for detail is important in many occupations. This perception test shows how quickly details are recognised when scattered over a large area*

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devices on the workman. Here are a few examples of the kind of question they are asking.

**First**, has the engineer's dream of "job simplification" sometimes gone too far? And for that matter, how often is the man with the stop-watch more interested in bringing the worker up to the pace of the machine than in accommodating the machine to the worker? Moreover, what has happened to the "motion" study which used to go along with "time"? How often is its absence disguised by the new and vague title of "work study"?

On more than one occasion psychologists have produced greatly increased output by re-assembling jobs which engineers have broken down. In one recent case, where a girl was subsequently allowed to perform several consecutive operations previously done by different girls, not only did the work become more interesting but the previous waste of time involved in picking components off the conveyor and putting them on again, was eliminated.

**Second**, to what extent are men who are good at *doing* a job, good at *teaching* it? How much waste is sometimes involved in retaining apprenticeship schemes which have their origins in sixteenth-century industrial methods? More than one firm enterprising enough to employ a trained psychologist as a personnel officer, have later found themselves badgered into employing a training officer as well, with remarkably successful results.

Whatever may be the doubts about some other fields of their work, one way in which psychologists can certainly help industrialists is in their knowledge of ordinary human capacity for learning and memorising—how far a lecture, fascinating though it may be to the lecturer, can actually be absorbed by his victims; when visual aids are the best way of driving home a point; how often it is necessary to check on the progress of new employees in their training, and how best to do this. The causes of ignorance and of failure to learn are not always understood by the experienced industrial executive.

A survey made by the National Institute of Industrial Psychology has shown that systematic training and the removal of learning "plateaux" can sometimes reduce training periods from eight months to eight weeks, and that increased efficiency and a reduction in the number of accidents can also be achieved.

**Third**, how far do carefully calcu-

lated incentive schemes really affect those they are supposed to stimulate? Recent research has indicated that however satisfied a works manager may be with the way he has explained his sliding-scale bonus scheme, many workmen simply do not understand how their bonuses are worked out. They expect to get roughly their usual earnings, and cannot appreciate differences. They have no clear idea of what extra effort means in cash. A less theoretically perfect scheme, which simply says "Bonus if you hit the target, no bonus if you don't" may well be much more effective.

**Fourth**, where merit-rating is used, psychological scepticism can be of enormous value in establishing fair play, in making clear to the assessors exactly what they are assessing and in smashing the "haloes" with which assessors are inclined to encircle their men. (For example, to rate a man as "good" at every aspect of his work under the influence of a general impression that he is a "good" worker.)

**Fifth**, what can the psychologist do for management trainees and men promoted from the ranks, after they have been carefully selected for their intelligence, stability, tolerance and broad-mindedness? One famous British firm who employ a psychologist, and who have to send considerable numbers of young managers overseas, train these men to think clearly by giving them books to review concisely, and by showing them extracts from the speeches of eminent politicians as object-lessons in how to

be deliberately confusing and misleading.

The trainees are also taught to examine their own behaviour and prejudices in the light of their particular background, and they are thus prepared for the task of fitting in to the ways of different peoples, overseas. Also case-studies, particularly films of problem situations, are widely used.



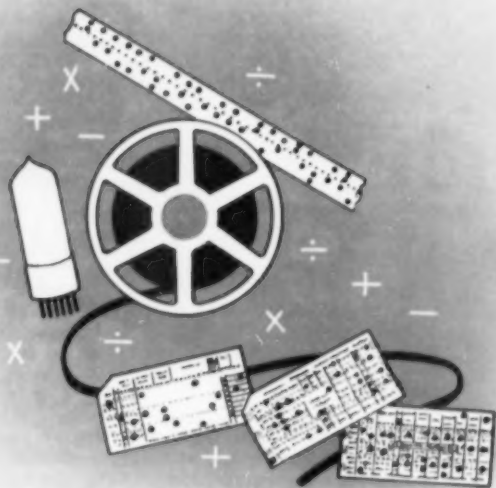
Since Elton Mayo showed at Hawthorne how productivity could be increased simply by taking an interest in what workers thought of their jobs, there has been a spate, particularly in America, of "attitude surveys" and research on "motivation and morale." Psychologists in Britain are now pausing to consider what really are the best uses of this sort of fact-finding.

First, the holding of an attitude survey is not now considered to have so much "therapeutic" value in itself—apart from its results. It may indeed turn out to be dynamite if workers' expectations of improvements are aroused, and no improvements actually result, either because nothing can be done to remove the cause of complaints, or through lack of sincerity on management's part. Psychologists are well aware of their own nuisance

*Continued on page 168*

*Quickness in seeing how one shape is built up from other shapes is tested by giving the box of wooden blocks to fit together. There is an obvious connection between this ability and a cutter's work on the various parts of a shoe*





### IN THIS ARTICLE: Latest trends

in electronic data-processing

★ Operational experience with an "automatic" office

★ How American firms are developing large-scale computing systems

★ New machines available on the British market

★ Computing services—and their prospects for the smaller firm.

# ELECTRONICS in the OFFICE

By PETER SPOONER

ONLY ten years ago the electronic computer was making its debut in the scientific world—and a few businessmen were looking at it speculatively. Today, a number of large computers are actually handling bread-and-butter office work. Moreover, some of their capabilities have been inherited by a family of small, relatively inexpensive data-processing machines, literally thousands of which are already operating as units of orthodox accounting systems.

Computer manufacturers and others insist—legitimately—that all developments in this field are evolutionary. It is, however, the sort of evolution which leaves the layman a long way behind unless he is continually watching and interpreting the situation.

For this reason, *BUSINESS* has prepared a straightforward progress-report, bringing right up-to-date the "Electronics in the Office" survey which appeared in our November, 1954, issue. The report discloses that some of the projects described in the original survey are now materializing, and it describes new projects which

may be materializing when the next report is written.

Here are the highlights:

1—Operational experience—in Britain and the U.S.A.—shows that large-scale business computing is already practicable and profitable under the right conditions. Reliability is such that standard office routines can be undertaken automatically on a daily and even hourly schedule.

2—More emphasis is being placed on unit-construction. In this way, advantages of standardization and mass-production are combined with the advantages of custom-building. Servicing is simplified too, and the problems of obsolescence are at least minimized, since new units can be dovetailed with existing installations.

3—"Common-language" machines (see *BUSINESS*, June, 1955, issue, page 99) are streamlining pre-computing operations by enabling coded information to be prepared as a by-product of other essential work.

4—Faster output systems are exploiting more fully the electronic com-

puter's calculating abilities. Now on the market are tape-operated printers operating at speeds of up to 1,000 lines per minute. Also available are many devices which convert computer data from one form into another—for example, teleprinter tape to punched cards, and cards to magnetic tape.

5—New technical developments are making electronic machines more versatile and more reliable. Outstanding examples are iron-core memory systems (already in use) and successful experiments in "transistorization."

6—Automatic programming is here. The principle—oversimplified—is that the computer takes over the job of writing programmes by drawing on an in-built "library" of sub-routines. In one system, the machine accepts plain-language instructions.

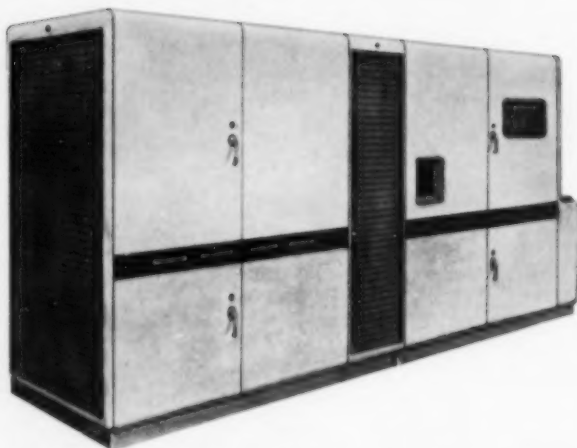
These are six of the more important developments revealed—or confirmed—during the past 12 months. Below, they are examined more closely in the light of specific installations and specific pieces of equipment.

### British Experience

IN Britain, operational experience of electronic business systems is as limited in many respects as it was last



*Deliveries of Powers-Samas' Programme Controlled Computer begin next Spring. During 1956, about 12 of these versatile machines will be installed in Britain and overseas.*



year. Some of the big scientific computers are being employed experimentally on commercial work, with surprisingly good results. The use of electronic calculating and multiplying punches has reached the point where new installations arouse very little excitement. A few more ambitious developments are in hand, and others are in sight. At present, however, the only British computer installation which provides real operational experience—indeed the only “complete” installation which has emerged from the experimental stage—is Leo, the electronic office computer devised and built by J. Lyons & Co. Ltd.

Lyons unveiled Leo in February, 1954—and the machine was immediately hailed as the advance guard of an Automatic Age in Britain's offices. In fact, it was then performing only a minute portion of its sponsors' clerical work. Over the past 18 months however, Lyons have been developing their “electronic office” systematically.

Leo's first routine clerical job was preparing the payroll for a department employing 1,700 people. Today, the electronic payroll application covers more than 10,000 of Lyons' 35,000-odd employees, and is saving approximately 1,500 man-hours per week in a highly-mechanized wages office. Soon it will cover 15,000 employees, and eventually the original wages procedure will disappear completely.

Meanwhile, Leo has taken over other routine office jobs. For the past 12 months it has been handling the daily orders from Lyons' 150 teashops in the London area. This work involves the preparation of all information and records for production, packing, transport, cost accounting, etc. Teashop manageresses use standard order forms, and late amendments are made by telephone.

How reliable is a large-scale business

computing system when employed on work of this type? Lyons' experience is reassuring. Operational faults average between two and three a week, and nearly all of them are of the sort which can be rectified within a matter of minutes. Over one period of six months there were only three faults which delayed operations for more than an hour.

Maintenance is undertaken by a small group of engineers, and special tests, carried out each morning before the work starts, pinpoint components which reveal signs of having deteriorated during the previous day's operations.

Since the pilot installation was made, Leo's speed has been increased considerably. *Leo II* (see page 172) is in fact four times as fast as the original machine and its reliability is greater too.

## American Developments

**U**NDoubtedly the most impressive—or, at least, most spectacular—developments in American data-processing methods concern the giant computing systems which Remington Rand and International Business Machines are now producing in substantial numbers.

These systems have much in common. Both of them are available in

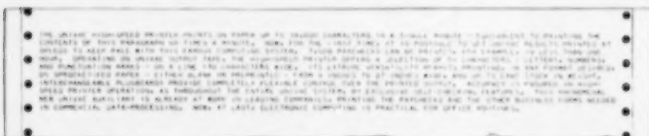
“scientific” or “general purpose” versions, employ magnetic-tape input-output and storage systems, cost approximately £8,500 a month in rental charges (Remington Rand's machine can be bought outright for about £350,000) and are being manufactured by assembly-line methods. In both cases a number of strictly commercial installations have been made.

Remington Rand have achieved the production rate quoted in our 1954 survey; four *Univacs* a month. In March this year, 28 of their giant general purpose machines were already in operation. *Univac* appeared on the scene as long ago as 1951, but the first commercial installation—at the General Electric Company's Louisville Division—was not made until March, 1954. A faster, even more powerful version, *Univac II*, has appeared this year.

Outstanding feature of the new model is its use of iron-core memory units. This development has more than doubled the speed of *Univac* processing, and has also increased by several times the quantity of data which can be accommodated in the high-speed internal storage system. The capacity of the external store has been increased too. The density of information on *Univac* magnetic tape, previously 128 characters to the inch, is now 200 characters to the inch; one 8in.-diameter reel of tape holds nearly three million alphabetical and numerical characters.

The *Univac* high-speed printer operates at the speed of 600 130-character lines per minute, and can print more than 7,500 pay cheques in an hour.

Remington Rand have introduced three methods of automatic programming. The most advanced method,



*The Univac high-speed printer operates at the speed of 600 lines per minute. This specimen was produced in one second*



known as *B-zero*, will accept plain language instructions and prepare a programme (from its "library" of sub-routines) which can be put into effect immediately. The new master programme can be added to the "library" if it is likely to be used again.

The *Univac* general-purpose system heads a family of medium-sized and small data-processing machines. One of the latest introductions is the medium-sized *File Computer*, which has extensive magnetic filing facilities and permits random-access processing of large quantities of unsorted data.

The first model of I.B.M.'s 702 data-processing machine—the general-purpose version of the 701 scientific computer—was delivered to Monsanto Chemicals in February this year. Initial applications include process costing, budgetary control and financial planning. A more powerful version, the 705 is already in production. Like *Univac*, it uses iron core memories—small, doughnut-shaped objects which can "remember" information indefinitely and recall it in a few millionths of a second—and its capacity is double that of its predecessor. The first 705 will be delivered within the next few weeks.

Altogether, more than 25 of I.B.M.'s giant data-processing machines are in use, and more than 150 are on order. The £8,500 a month rental includes the services of a team of resident engineers who have "grown up" with the machine while it was on the production line. Customers provide their own programming staff, but I.B.M.—like Remington Rand—have set up comprehensive training facilities.

New I.B.M. printers take the results of calculations from the computers and prepare bills, receipts, premium notices, and other business forms at the rate of 1,000 lines per minute. The computers themselves are fast-workers: a 702 at I.B.M.'s Poughkeepsie plant does the calculations for an 8,000-employee payroll in 24 minutes.

More than 100 650 magnetic drum data-processing machines, introduced one year ago, are already in use, and the company expect to deliver another 700 of them within the next three years. Basically a punched-card machine, the 650 can now be equipped with magnetic tape units and a coupled printer on the same lines as the big machines.

The company have already put into production the 608 transistorized computer. Although smaller than the 604 calculator, it is two or three times more powerful. In addition to transistors, it uses printed circuits, and

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other "miniaturization" techniques, and also incorporates a magnetic-core internal memory system.

Potentialities of "integrated data-processing" are illustrated by the National Cash Register Co.'s *Natron* system. This is built around a medium-speed computer, employing punched paper tape as its input system. The tape can be prepared, often as a by-product of ordinary book-keeping entries, on automatic electric typewriters, accounting machines and other data-originating equipment which incorporate tape punches. N.C.R. are equipping many of their standard machines for this purpose. The system employs magnetic tape storage.

Burroughs, too, are particularly interested in common-language devices and other "transitional" equipment which fills the gap between manually-operated and automatic accounting systems. A recent development is a high-speed printer which reads information from either punched cards or magnetic tape and prints at the rate of 900 lines per minute. Even faster printers are under development.

In addition to their large *Udec* computer, Burroughs are producing the

*E-101* desk-sized machine, with pin board programming and keyboard input. A number of these machines, illustrated in the 1954 survey, have now been installed.

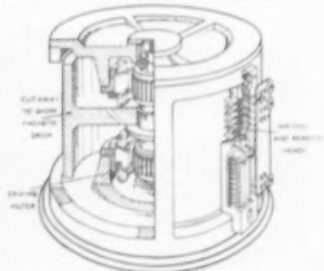
## British Machines

BRITISH manufacturers cannot match the scale of American developments, but they are more than holding their own in one important field—the production of small and medium-sized "real" computers. Some, moreover, are converting machines originally designed for scientific work into practical business systems of the type and size which are likely to interest a large number of organizations. Here, briefly, are the main developments:

► *Hec*, the British Tabulating Machine Company's small computer, has been in production for some time. Some machines of the original series, designed specifically for mathematical and scientific applications, are already installed.

One, for example, is controlling the production programme at the Esso Petroleum Company's Fawley refineries; another is resolving mathematical problems in the scientific research laboratories of an electrical manufacturing company. Both of these installations are still at the preparatory stage where alternative formulae are being clarified and tested before the computing routines are firmly established, and it is too early to catalogue the results.

Another machine of the same series is being supplied to the Indian Statistical Institute, where it will undertake a variety of scientific mathematical and statistical work. The *Hec* general-purpose computer, suitable for commercial and industrial use, is also in



A magnetic disc store (right) can be incorporated in the Elliott 405 business computing system. It holds up to 16,384 computer "words." Above: This cut-away sketch shows the Pegasus computer's main store—a magnetic drum revolving at 3,750 r.p.m.





production, and the first machine will be delivered early next year.

► Elliott Brothers (London) Ltd. are manufacturing the *Elliott 405* unit-construction business computing system—the outcome of development work described in the November, 1954, survey. The first machine is almost finished and will be employed initially on calculating payrolls for the manufacturers' own establishments. This, however, will occupy only a small proportion of its time, and it will also undertake production planning and demonstration work.

The *405* is composed of a "system centre" (a self-contained computer resembling Elliott's £25,000 machine, the *402*) to which may be added a variety of input-output and storage units. Each installation will be, in effect, custom-built, and the user will be able to add or replace units at a later stage.

Two types of punched-tape reader are available, and as an alternative input system, the manufacturers have developed a fast punched card reader which handles standard 80-column cards at the speed of 100 per minute. Output is by teleprinter tape perforator, electric typewriter, magnetic tape (which can be fed, as an independent operation into a number of teleprinters or electric typewriters) or a *Bull* printer operating at the speed of 150 92-character lines per minute.

Various storage systems are available, including a magnetic drum (as used in the *402*) and a magnetic disc store with four times the drum's capacity. For storing large quantities of business data in a form which can be fed into the computer quickly (and modified where necessary), Elliott have developed a multi-channel magnetic storage system using 35mm. film. Alternatively, the *405* can incorporate a magnetic tape storage system.

► English Electric's big scientific and mathematical computer, *Deuce*, was demonstrated for the first time in February. The company are using one of these £50,000 machines at their Stafford Research Laboratories, and another is operating in the vicinity of its four-year-old parent—the *Ace Pilot Model*—at the National Physical Laboratory.

A third machine is working at the Royal Aircraft Establishment, and a fourth will soon be installed at Marconi House, London, where English Electric are setting up a computing service. Others will be supplied to government departments and private organizations.

The *Stafford Deuce* is employed mainly on scientific calculations. In its present form, the machine is not so adept at handling large quantities of simple business arithmetic. Nevertheless it has undertaken successfully and profitably, a fair amount of clerical work; the company estimate, in fact, that payroll calculations on *Deuce* (at the speed of 3,000 "cases" an hour) will reduce by approximately 60 per cent the costs of their Stafford works' wages and cash departments.

They also have under development modifications and ancillary devices (including multi-channel magnetic tape recorders and writers) which will increase considerably the computer's capabilities in this field.

► Now in production is *Pegasus*, the medium-sized "packaged" computer which Ferranti Ltd. originally announced as the *F.P.C.I.* It costs £35,000, has punched tape input and output devices, and incorporates a number of

features which simplify programming.

*Pegasus*, at present, is primarily intended for technical calculations. But Ferranti regard it as a "universal" machine, and are "well advanced" with development work on auxiliary systems using magnetic tape or punched cards.

Their big *Mark I\** computer is, of course, established. Eight of their machines are in use, and much experimental business work has been done on them.

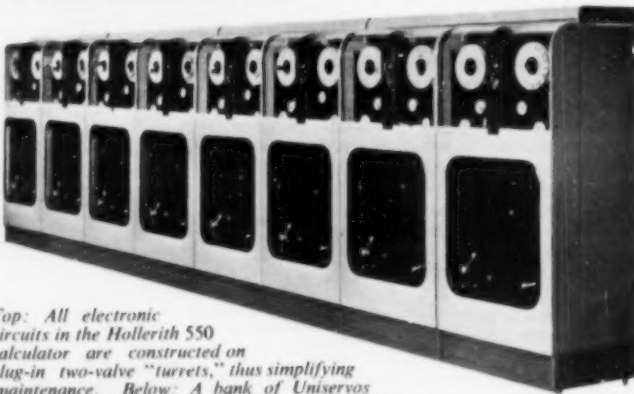
Ferranti's one-year-old collaboration with Power-Samas has already produced one piece of equipment—a self-contained input-output machine using punched cards. Various projects are in hand.

► I.B.M. United Kingdom Ltd. have extended their activities in this field. Last year, they were marketing three electronic data-processing machines in Britain: the *604* and *626* calculating punches, and the *IBM* card-programmed calculator. Now they are offering British firms a range of American- and French-built equipment—including the giant *700* series.

One American machine is being installed at the Derby factory of Rolls-Royce Ltd.: a *650* magnetic drum data-processor. Rolls-Royce will eventually use it for both commercial and scientific calculations.

More than twenty *626* calculators are now in use in Britain. A progress report on one of the first installations, in the City Treasurer's office at Coventry, appeared in the April, 1955, issue of *BUSINESS* (page 87). Soon, it is anticipated, electronic data-processing equipment will be in production at the company's Greenock factory.

*Continued on page 172*



Top: All electronic circuits in the Hollerith 550 calculator are constructed on plug-in two-valve "turrets," thus simplifying maintenance. Below: A bank of Uniservos provides the Univac computer's external "memory"





# The Americans in Scotland

## What Can We Learn from Them ?

By JOHN PARKYN

SO much has been written about the superiority of American firms to their British counterparts that it is surprising so little has been done in the way of actual comparison. How, for instance, do American management-worker relations compare with British? What are the main differences in production methods? And what truth is there in the statement that the higher output of American workers is due to the greater willingness of their managements to re-equip with the latest machines?

These are big questions, and ones which are not easy to answer in a single article. But to gain at least some insight into American methods, we now have only to look "north of the border," where an extensive colony of U.S. subsidiaries has grown up.

Just how big is this U.S. "invasion" of Scotland? In the first place, it is almost entirely a post-war development. In 1939, only one American firm was established on Scotland's industrial estates; today, there are nearly 30—representing more than 70 per cent of the total number of American firms setting up in Britain since the war. All told, U.S.-owned sub-

sidaries in Scotland employ 13,000 people, occupy 3,000,000 sq. ft. of factory space, and have another 770,000 sq. ft. sanctioned or under construction.

These points raise three major queries:

- ▶ Why is Scotland preferred to other parts of the British Isles?
- ▶ What methods did the Americans use to set up their subsidiaries, and establish good relations with their "foreign" employees?
- ▶ What sort of production methods did they bring with them?

This article attempts, in the three sections which follow, to answer these questions.



### Why Scotland ?

As already mentioned, Scotland has gained over 70 per cent of American-owned subsidiaries set up in Britain since the war, despite the fact that only 10 per cent of the total population live there. Three reasons are given for this popularity:

- 1—The prevalence of Scottish labour (the rate of unemployment is

Of the many American firms settling up British subsidiaries since the war, no less than 70 per cent have chosen locations "north of the border." This article gives the reasons for Scotland's appeal, and presents a detailed account of how two of the firms involved have tackled the problems of establishing new factories, training local labour and installing the latest production techniques.

nearly twice that of England)

- 2—The first-class facilities for exporting to all parts of Europe
- 3—The availability of modern factory buildings on the industrial estates.

The first two reasons are self-explanatory, but the third needs a little closer examination. The number of up-to-date factory units (all erected since the end of the war) is primarily due to the efforts of two organizations—the Scottish Council (Development and Industry) and Scottish Industrial Estates Ltd.

The Scottish Council is a non-political, financially independent organization which acts as a kind of



A major feature of post-war Scottish development is the number of large and attractive industrial estates which have sprung up. Shown above is Hillington, which alone houses more than 140 firms

unofficial governing body in all matters relating to Scottish industry. One of its aims has been to reduce unemployment and open up new areas by encouraging the entry of firms from abroad, particularly those specializing in the light engineering, electronic and office equipment industries. Working in close co-operation with the Government, it has encouraged and, in many instances, directly assisted in the establishment of American firms in Scotland.

Of equal importance has been the rapid development of the new industrial estates, under the supervision of Scottish Industrial Estates Ltd. The first estate—at Hillington—was opened in 1939. Then came the war and a complete cessation of activity until 1946, since when 19 more estates have been opened. At present, these provide some 360 firms with a total of 15 million sq. ft. of factory space.

Industrial estates have many attractions, especially to an overseas organization. In the first place, they offer all the advantages of communal living—estate canteens, joint health services, and so on. Secondly, most of the factories are “pre-built”—that is, they have been constructed by the controlling company who then rent them out to an interested firm.

Factories are all of modern and attractive design. The most popular type, known as the “standard” factory, consists of a single-storeyed building covering an area of 5,000 sq. ft. Offices, cloakrooms and toilets are located in the front of the works, but the layout can be modified to suit individual requirements. Two types of roof lighting are available, again to suit the needs of the tenant company.

Another type of building, known as the “nest” factory, covers an area of 1,400 sq. ft. only, and is thus specially suited to the needs of the

very small firm. There is also a third type—the “engineering block”—which is equipped with a high roof and special crane facilities.

## Setting Up—and Settling Down

So much, then, for the reasons why American firms have headed “north of the border.” It is proposed now to examine briefly how they went about setting up their new subsidiaries and taking on labour.

For this purpose, let us take as an example Euclid (Great Britain) Ltd., an offshoot of a large Cleveland, Ohio, road-making machinery manufacturer. At present, this company occupy an area of 168,000 sq. ft. on the Newhouse estate near Glasgow, and have another 96,000 sq. ft. under construction.

One of the problems to be resolved when setting up a subsidiary is the method of supervision that should be exercised by the parent company. When Euclid commenced operations in 1950, they formulated the policy of sending over appropriate experts as each department was formed. First to arrive were specialists in factory siting and layout; then came experts in general administration and personnel selection; and, finally, the technicians concerned with actual production. After a year, however, when technicians recruited locally had had a chance to find their feet, this policy was reversed, technicians from Scotland going over to the States as and when new techniques were introduced. At the same time, the number of American supervisors was gradually reduced, until now only three remain. This number will continue to decrease, and it is hoped that finally the factory

## SCOTLAND By an American

Some controversial observations on American firms in Scotland appeared recently in *Foreign Commerce Weekly*, a U.S. Commerce Department publication. The author was Taylor G. Belcher, until recently the U.S. Consul in Glasgow, who based his remarks on interviews with six representative firms.

Here are some of the points he made:

- It has been found that American managerial staffs must be retained longer than was at first anticipated by those firms which did not plan to keep U.S. personnel permanently in Scotland.

- The only real troubles appear to be time factors, which are costly but not insuperable . . . The advice most usually given is to make cost and time estimates based on U.S. experience and add 50 per cent . . . In most cases, delays have been caused by lack of programming and supervision by contractors.

- Rejection rates on material and component parts supplied from outside sources is much higher than is normal in the U.S.A. This generally is attributed to lack of an adequate system of quality control and inspection deriving from, among other things, poorly-trained operatives in supervising positions. Experience indicates that in some cases British management apparently considers inspection and quality control an unwarranted overhead expenditure . . . Difficulties have also arisen from unfamiliarity with U.S. specifications and drawings.

- Most firms have found it advantageous and indeed necessary to send key personnel to the U.S.A. for training in American methods, which has been an expensive but valuable procedure to follow, and one for which the new firm should allow.

- With regard to the effect of these problems on relative efficiency of operations compared with the parent concern, the results are varied. One firm reported that its operations in Scotland are more efficient by about 5 per cent, but the average reported a level of about 80 per cent of the accepted standard in the U.S. plant.

BUSINESS

personnel will be 100 per cent "local".

Another interesting, and possibly surprising, feature is the company's marketing policy. All export sales, American and Scottish, are handled by a central sales division in New York, but the two factories are nonetheless encouraged by the management to compete for their markets. This has already helped in stimulating the production rate, and it is a matter of pride to the Newhouse works—including the resident Americans—that, on several recent occasions, they have beaten the parent factory to a contract by offering earlier delivery dates.

This pride in their work has been engendered by some—according to British standards—rather unusual methods. For instance, the firm do not operate an incentive scheme—a source, incidentally, of constant dissension between management and workers—as they consider it likely to result in scrappy workmanship, especially on high-quality products. At the same time, their executives have never tried to hide the fact that they expect a good day's work for a good day's pay, and

will soon get rid of a man who fails to pull his weight.

An interesting sidelight is the workers' decision to reduce their working day by fifteen minutes (for which they are paid) in lieu of morning and afternoon tea breaks. The management also desired this change, due to abuse of the period allowed for coffee breaks in the Cleveland factory.

In return for conscientious workmanship, however, the company provide many advantages, particularly in regard to welfare amenities. These include an attractive room for those of their workers who prefer to bring sandwiches from home rather than go to the estate canteen; washrooms and locker-rooms of the very latest type; comprehensive insurance in case of injury, etc.

In the factory itself, modern mechanical cleaning apparatus ensures that the floors are maintained at a standard of cleanliness far above that of most heavy engineering firms. To provide really comfortable working conditions, a constant temperature rate of 65° is maintained throughout the year—no

mean feat considering the exposed location of the Newhouse estate. For lighting, 35 foot-candles of light—three times as powerful as those used in many British factories—are provided at working level. "It's just like daylight," said one worker.

Standards of workmanship required by the company, too, are above average. It is not unknown for more than 50 applicants to be rejected before a suitable man is taken on. The company policy in this matter was summed up by the American works director, when he said: "We would rather go short-staffed for six months than take on a man we hadn't got faith in."

## Production Methods



IF there is one predominant reason for the high output levels in American industry, it is almost certainly that, so far as possible, they prefer to put the onus on the machine than the worker. Give the operator a correctly-set machine and a clear ABC of what to do, is their attitude, and you'll get results.

As might be expected, they wasted no time in introducing similar techniques into their subsidiaries, not only because these had proved highly successful in their own factories, but because their new employees, unused as they were to U.S. production methods, were often in need of a clear guide to their duties.

One example of American production "streamlining" is operated by Honeywell-Brown Ltd., Scottish subsidiary of the Minneapolis-Honeywell Regulator Company. The firm's chief lines are industrial instruments and automatic control units—high-precision products, requiring careful supervision throughout the many and varied stages of manufacture.

To ensure a standard of production equal in every way to that of the American parent company—and to offset any difficulties which might arise from employees not being fully versed in high-precision workmanship—the Scottish management introduced from their parent company an unusual operation sheet/production order system, which streamlines production and ensures that everyone is quite clear as to what is expected of him.

Basis of the system is a reproducible form which acts as a record of all the



*American firms spare no expense to ensure that their employees have first-class welfare amenities. Shown here is the "sandwich" room (left), and the washrooms provided by Euclid (Great Britain) Ltd. at their Newhouse plant*



information required by the different departments. Copies taken from this form provide such varied information as standard costs, tool location, work stations, etc., and are used primarily as movement vouchers for work in progress. Inspection and rejection information is also given.

The form is initiated by a "planner" in the engineering department, who starts by choosing the material from which the component or piece part will be made. All these materials carry a code number, which is entered on the form and used for reference by the purchasing, stores, and cost accounting departments.

The next step is to list the operations required to make the piece. This necessitates choosing a machine to carry out the work, so the machine group, too, is marked by a code reference. The planner then describes the operation in detail, and lists the press tool, jig and fixture which will be required. Here again each tool has a numerical code which can be referred to by the drawing office and the costing, tool-making and progress departments.

The planner then chooses the class of labour, male or female, skilled or semi-skilled, who are best suited to carry out the operation. To do this, he refers to a coded labour grading schedule, devised by the personnel department, which also provides information for shop foremen, and the wages, standard costing and progress departments. Operation time is also shown, and this, together with the labour grading, automatically indicates the standard labour cost of the operation, while the time, labour grading and machine group coding together provide the production controller with all the basic information required for efficient machine and shop loading. This is done by multiplying the quantity of the run by the other information entered on the form.

### Copies Made

As well as providing a "blueprint" of operations the form is used as a production order. When it becomes necessary to run a component, a copy of the appropriate form is run off from the master copy on a duplicating machine. The order is given a number, and the quantity required is marked on the copy, together with the completion date set by the production controller.

The sheet is then routed on a tour of the various departments, including the manufacturing sections. It goes first



*In the Honeywell-Brown factory. Work has been greatly simplified by use of the operation sheet/production order system described below*

to the stores, where it acts as the voucher authorizing removal of the materials required, and is then passed on to the machine shop, where it becomes the voucher authorizing jigs and fixtures to be supplied to the machines. In addition, it provides the progress department with the information needed for calculating incentive bonuses.

The back of the form is also put to good use. This is partly occupied by a "planning record," which is filled in by the progress department and shows the completion dates for each of the operations in sequence. As each operation is completed, the date is entered alongside, so that the progress of the work can be seen at every stage. Details of both floor and final inspections are entered as the job progresses, and the number of rejections is noted, thus providing statistical scrappage information.

Finally, when the job has been completed, the form becomes an advice note to the stores that the components are available. It is then routed to production control to make the necessary inventory record movements.

Thus, by the time it completes its travels, this single sheet of paper has provided no less than 13 different records. Summarized briefly, these are:

*In its capacity of operation sheet—*  
a permanent engineering record of the component or assembly;  
a bill of material in the case of sub-assemblies, and a raw materials record in the case of components;  
a machine-loading voucher;  
a record of all tools and fixtures owned by the company;  
a standard costing system;  
an advance list of labour requirements.

*And in its capacity of production order—*

an authorization to commence production;  
a requisition form for materials;  
a time sheet for bonus calculations;  
a record of inspection;  
a stage-by-stage report on the job's progress;  
a complete record of the raw materials used, and of the movement of components.

Quite obviously, where such a mass of information is collected on to one sheet, the next problem is how to ensure that all departments gain the fullest possible benefit from the master files. It is not sufficient, for example, that the cost accountant should have a standard cost of each individual operation or component. He must be able to select groups of standards to produce costs of assemblies and final production items. Nor is it enough for the production controller to know the machine loading times and quantities of material for individual components. To load his shops he must also be able to withdraw and tabulate speedily from the master file information.

To overcome this difficulty, each operation sheet is made the basis for producing master files of punched cards. All the information on the sheet—plus the end use of the component or assembly—is key-punched. In this way, the cost accountant can obtain a tabulation giving him standard costs of any variation or combination that he requires; the production controller can convert his production requirements into machine loadings; and the purchasing department can discover just how much and how many types of raw material are required by the production programme.

## HOW TO ADVERTISE ON A LIMITED BUDGET—4

# Merchandising and Dealer Aids

By DON A. TIBBENHAM, M.I.P.A.

Managing Director, Tibbenham Publicity Ltd.

*The theme of this article is how to win the co-operation of your dealers in putting your products over to the customers. Points discussed include packaging, trade press and local advertising, and the use of show cards and display stands.*

**W**HAT is meant by merchandising? It refers to all those actions which are devised to make selling easier and are not, in the true sense of the word, advertising.

Sheer weight of consumer advertising has been known to create a demand strong enough to carry products from the factory floor through the various trade channels to the user, but this is costly and risky. Today, merchandising goes hand in hand with advertising and is given more and more attention.

It is vitally necessary to obtain the fullest co-operation of salesmen, wholesalers and retailers. At the same time *saleability* and *desirability* must be constantly uppermost in the producer's mind. Public taste is constantly changing as new ideas and new products make their impact upon the population, and the manufacturer must keep in tune.

What are the main things to consider when merchandising a product? It must, of course, depend upon so many factors. Is the product sold in a

pack of some kind? Is it sold by the yard? Is it equipment which cannot be parcelled? Is it furniture, food or fashions? Perhaps the questionnaire method will provide a useful guide to "seeing the product as others see it."

Here are fourteen questions:

- 1—Is the design of the pack in keeping with today's tastes?
- 2—Is the pack size right? Does the public want a smaller size for travelling, or a larger size for the home?
- 3—Would a larger size mean a reliable reduction in costs which could be passed on?
- 4—Are the packs easily displayable?
- 5—Would a change in colour scheme fit in better with a new trend in fashion?
- 6—Is the brand name large enough?
- 7—Are the directions for use written in a concise enough manner? Have you overlooked the necessity for directions?
- 8—Is there a host of other uses which could be detailed on a direction sheet to include inside the pack?
- 9—Would it be possible to alter the pack so that it has another use once the product has been consumed?
- 10—Could the pack be made into a toy or puzzle or gimmick for children to play with?
- 11—Would it help the dealer if the packs were received in cartons, which could be displayed on the counter, or does he prefer to stack the items on his own shelves?
- 12—Are the seasons being used to give a new sales angle? (Such as ornamental wrappings for Christmas and Easter, and special gift cartons or boxes for Father's Day, Valentine's, etc.)
- 13—If basic costs are reduced, should the price to consumer be lowered, or will it be better to give something extra for the same money?
- 14—What of the product itself? Has it been consumer tested and will it do



When Birdseye Foods Ltd. changed their packs from the straightforward labelled type (above) to show the consumer a full-colour picture of the goods inside (right) they advertised extensively in the trade press to enlist the dealers' co-operation in introducing the new packs to the public







Full-page advertisements (above) appeared in the trade press when Birdseye Foods changed the design of their frozen food packs. At the same time, show cards exhibiting the new packs were circulated to dealers for display at the point of sale

all that is claimed of it? Is the design sufficiently up-to-date to compete with new products? (This is, of course, a subject in itself, but attention must be drawn to it because of its great importance).

These things are an important aspect of merchandising and should not depend merely upon the particular tastes of one man, unless, of course, he knows all the answers!

Not many years ago a mass of products were sent out unpacked for sale to the public, which today the consumer would refuse to buy in that form. Soap used to be sold in bars which had to be cut at home; salt in large blocks; sugar sold by weight and packed by the grocer. Now, these items are available in convenient packs and the commodities are brought more effectively before the eyes of the user. They protect the consumer

against short-weight and adulteration. They make home storage easier, and, in some cases, take the product right on to the table.

Efforts to attract the user are only one side of the picture, and the most difficult problem is ensuring that the dealers stock the product and display it. There is considerable opposition to new products as a whole unless they open up a new market, provide a more convenient presentation of an existing line, create a speedier turnover and provide a larger profit.

Let us assume all is set, ready for business to begin. The product has been designed, tested and approved, and is in full production! The Trade must be informed and sold—sold not only on the product itself, but on the merchandising methods and the advertising programme.

Announcements must be made in the Trade Press. Be sure you treat your announcement with courage—be bold! Make a big splash! A double-page spread in colour, or, if you need it, four or even six pages consecutively—make an impression from the start. Direct-mail the trade with details of your merchandising methods. Tell them how and where and when to display your new product. Show them samples of the advertising and inform them just how you intend helping them with free blocks, local press advertising, and so on.

### Sharing the Cost

Localized advertising can prove most valuable. Manufacturers might pay 50 per cent of the cost of dealers' local newspaper advertising, or place special advertising on the dealer's behalf. Before doing this, the question of newspaper rates should be considered because there are still a number of publishers who allow a reduced rate to the local advertiser.

In the first instance, trade may be restricted to one or more test areas, or it may be planned to develop outwards from a particular area. When this is done it is possible to concentrate the sales staff to obtain maximum efforts.

Advertising in the local press, in local cinemas, theatres, and places of amusement, also on strategic poster sites, is appreciated by the stockist. He knows the value of advertising in the town or city where his customers live, and it associates his name with the product in a manner which national advertising cannot do.

Supply the dealer with blocks for use in his own advertising and in his own catalogues. Make it as easy as



## Merchandising Musts

- 1—Keep trade informed about product, merchandising methods, and advertising programme.
- 2—Supply dealers with blocks for use in their own local advertising and catalogues.
- 3—Ensure that packaging is in step with current public taste.
- 4—Pay great attention to showcards—they must compete with hundreds for the dealers' display space.

possible for him to make up complete advertisements with space for his name and address. Six-inch double-column spaces are the most acceptable although larger spaces should in some cases be offered.

Point-of-sale aids should be supplied, but remember, the retailer is inundated with them and yours must compete for his attention. There is an enormous waste in this sphere of merchandising because insufficient attention is given to their design, size, shape, colour and utility.

Showcards can be used in windows, on counters, on the floor near the product, and on back shelves or special display stands. In the main, good advice is not to make your cards too large; a useful size is probably 14in. x 10in. In chemists' shops a useful size would be smaller, say about 8in. x 6in. However, dealers' windows should be studied carefully to ensure that the most suitable size is supplied. Various trades have different customs which dictate the maximum.

The showcard which says "WE STOCK & RECOMMEND Blanks Quick Boiling Kettles" is more likely to be displayed than one which merely says "Blanks Quick Boiling Kettles Save Minutes and Pounds." In the former card, the dealer is being brought into the picture, while the latter is merely a straight advertisement for the product. It must be remembered that the dealer wants to build HIS business, not the manufacturers'.

Leaflets which are too large for a standard commercial envelope, or that allow insufficient space for the dealer's "rubber stamp," or are poorly designed and badly printed, will

either not be used at all or will be relegated to a back position.

Animated display units, especially in smaller sizes, will stand a good chance of being used, particularly if they are simple to operate. Movement always arrests attention.

Where very large window display units are being offered, it is better to send them out with a display man who can undertake the erection and also fit pelmets and other material.

In the fashion trade, many manu-

facturers, in order to obtain the fullest co-operation, will erect a miniature "shop" within a store as a permanent feature, or provide special display units for use in smaller shops.

Dealers naturally prefer the larger unit sale because it means more profit for the same effort. This can be achieved in a number of ways:

- a An item can be packed in boxes of 3 or 6 or more.
- b A range of products can be offered in a single carton.
- c Items which are normally used together or work together can be made up into special sets.
- d Certain items lend themselves for making-up into holiday packs.
- e Seasonal gift cartons may be designed to hold a range of products attractively displayed.

All these items call for extra advertising. The consumer must be informed. The stockist is too busy to tell every customer about all the new lines available, and he expects the manufacturer to assist him to do it.

Consumer advertising can play a vital role in forcing the hand of the dealer, but it can be very costly. Adequate distribution to the dealers should be obtained before national advertising is undertaken. So let your slogan be "Set the Goods Close to the Consumer, then, Get the Consumer Close to the Goods."



*This self-service dispenser is a useful method of displaying a range of goods marketed by a manufacturer*

# How to Use Work Study in the Office

By ALAN PETERS

**A**LTHOUGH work study has raised the level of efficiency in hundreds of factories, remarkably few companies use it in their offices as well. The experience of the few suggests, however, that systematic work study, employing virtually the same techniques as the industrial "variety," is capable of improving the administrative and clerical operations of many firms provided (1) it is applied sensibly and resourcefully by men of the right calibre; (2) its purpose is understood and approved by the people whose jobs are being examined; and (3) the project is actively supported by all levels of management.

This article pinpoints some of the opportunities—and emphasizes the importance of the provisos—by describing the progress of a full-scale work study investigation which is taking place at the London headquarters of Burroughs Wellcome and Co., manufacturing chemists.

The investigation was set in motion about 18 months ago, after the company had successfully adopted a detailed system of work study in their main factory at Dartford, Kent. A continuous operation, embracing in time the work of every department and every employee, it has already produced a number of impressive savings—for example, a reduction of approximately 30 per cent in the labour costs of the shipping and despatch sections. Even more impressive is the co-operative spirit in which the office staff have accepted the investigation and the changes arising from it.

Many businessmen will regard the company's success in this direction as more illuminating than a record of specific improvements like "X operations simplified" and "Y forms eliminated," some of which might have been achieved piecemeal by less purposeful methods. They may also consider that it answers convincingly the arguments of people who oppose clerical work study on principle: *Office workers are individualists . . . their output cannot be measured in the same way as the output of machine or*

*The full-scale work study investigation which Burroughs Wellcome and Co. are carrying out at their London head office really involves the systematic study of office routines—and the use of a considerable amount of commonsense. Already it has made substantial reductions in the operating costs of several departments. Moreover, it has proved that careful planning and presentation will overcome the feelings of suspicion with which employees might otherwise regard an investigation of this nature.*

*assembly line operators . . . starting a company-wide investigation would undermine their confidence, lower their morale and increase the rate of staff turnover . . .*

Burroughs Wellcome and Co. have not experienced catastrophes of this sort. Undoubtedly the danger existed, but it was overcome by a mixture of commonsense and careful planning.

## Top-level support

"The process of understanding must start from the top and work downwards . . ." These words appear in the first of two work study booklets published recently by the Association of British Chemical Manufacturers. The chairman of the Association's work study advisory committee is Dr. D. E. Wheeler, managing director of The Wellcome Foundation Ltd. (whose trading company is Burroughs Wellcome and Co.) so the fact that the company have already practised what the booklets preach is not surprising. Dr. Wheeler's enthusiasm has infected other executives, and the project has the surest of all foundations: the confidence and energetic support of top management.

To provide an effective link between the management and the work study officer (who has no executive authority) the managing director set up a three-

man committee responsible to him. One of its members is the officer himself; the others are the company secretary and the deputy chief accountant. The committee meets informally about once a month to assess the progress of current operations, to plan future operations, and to consider matters of policy arising from current investigations. After being approved, and sometimes modified by the committee, the work study officer's tentative programme is passed for confirmation to the managing director, who also receives regular progress-reports.

The task of developing the right attitude at lower levels was simplified by the fact that the company were not introducing overnight a policy which their employees were going to regard as "revolutionary." Method study had been practised at head office for many years. When the original methods officer assumed his present title, after completing a 10-week course at the Work Study School, Cranfield (the same type of course which his "opposite numbers" at the factory had attended), he was simply extending the scope of his own activities over a period of six years. These activities had produced good and manifestly fair results, and no one saw a sinister motive in them.

The circumstances, therefore, were propitious. Nevertheless the com-

pany decided that it would be unwise to make even a pilot study in one corner of the organisation before all members of the staff (about 400) had been told precisely what was going on.

When work study was introduced at Dartford in January, 1953, the company organized a number of three- and five-day "appreciation" courses for departmental managers, section heads, supervisors, foremen and employees' representatives. A similar policy was adopted at head office, although here the courses were telescoped into a series of meetings.

The first set of meetings were attended by senior executives and departmental managers. The purpose of work study was explained frankly, and a variety of questions were answered. In addition, three assurances were given:

- 1—Employees who became redundant as a result of the investigation would be absorbed through the normal staff wastage in their own and other departments.
- 2—The function of work study was advisory, not executive. No changes would be made in a department's routines without the approval of its manager.
- 3—The investigation was concerned with the efficiency of future operations. There would be no inquests, no recriminations. No one would be asked: "Why are you doing things in this inefficient way?" or "Why hadn't you thought of this yourself?"

The same story was told, and the same assurances were given, at meetings attended by section heads. These people were asked to spread the information among the rank-and-file.

Now the stage was set. The company realized, however, that the first project must be one assured of success—one moreover, which would demonstrate the value of clerical work study by producing recognizably good results. For diplomatic reasons it would be unwise to pick on the activities of a single department; in any event, the interdependence of departmental responsibilities made this course impracticable. The only satisfactory method was to take one routine and follow it from beginning to end.

The overseas order routine was chosen for a number of reasons, and as soon as this choice had been approved, the work study officer set about the lengthy task of preparing a flow-chart for the complete routine. The chart was based entirely on first-

*An investigation in the re-designed record store disclosed that the top filing drawers were not being used because the staff found them inaccessible. A specially-built ladder unit overcame this difficulty.*



hand information, obtained by "sitting in" with the employees concerned and observing what they actually did, not by accepting their departmental manager's conception of what they should be doing. At each sitting-in operation, the original assurances were repeated and, of course, both manager and employee received adequate notice of the investigator's movements.

The overseas orders routine involves two departments of head office: the overseas division, which is responsible for (a) sales and (b) orders and outgoing goods; and the transport division, which handles bills of lading, shipping documents, etc. An intermediate stage is the packing and assembling of orders at the Dartford factory. Operations in all three sections were plotted on the flow-chart.

### Work Eliminated

The next step was the elimination of unnecessary operations. After all, there was no point in trying to improve things which could be dispensed with altogether—hence the value of obtaining a complete picture before any specific improvements are attempted.

The results exceeded the company's expectations. In one section, with a staff of 16, the elimination of unnecessary operations saved 188 man-hours a month, representing eight per cent of the section's work. The overseas division did not provide many opportunities, since its operations had already been subjected to method study; over a period of five years, in fact, its staff had been reduced by approximately 20 per cent. It was in the transport division that the main savings were achieved.

Altogether, the transport division's staff was reduced by 28 per cent. Its

redundant members—seven full-time clerks and one part-time clerk—were quickly absorbed as vacancies occurred in other departments.

Here is an example of the manner in which improvements were made by orthodox study. The investigator found that three forms, differing only in colour, were being used in the preparation of shipping outward records. Because of the urgency of many overseas orders, he was told, it was essential that three people should work on these forms simultaneously, each completing only one section. An investigation showed, however, that the work of two members of the trio had to await the results of work by the third. Once the fallacy of the method was exposed (of course, it might have been justified at some time in the past) the superfluous forms were eliminated.

Similar improvements were made by studying clerical operations in the packing section of the Dartford factory. Here, the overseas order routine involved three types of packer's note: a four-part set for large miscellaneous orders, a four-part series note for large orders for one product, and a two-part set for post orders. It was found, after investigating the procedures, that one re-designed form would suit all routes and all types of goods; and that two copies would suffice in all cases. The result was a substantial saving in (1) printing costs; (2) clerical work (particularly important in view of the fact that factory employees seldom excel in this field); and (3) filing space.

Theoretically, at least, a work study investigator should concentrate on one project at a time; if he is continually sidetracked, the investigation is unlikely to produce the clearly-defined results which have so much

"propaganda" value in the early stages. In practice, however, it is seldom convenient to make this principle a hard-and-fast rule; hold-ups occur while new forms are being designed and printed, and while new methods are being put into effect. For this reason Burroughs Wellcome and Co. launched another project at head office at a time when the overseas orders routine was still under investigation.

The second project concerned filing—an unspectacular operation which has, nevertheless, an appreciable bearing on the efficiency of all business activities. At that time, the company had (1) a central filing department in London, mainly for the purpose of accommodating day-to-day orders and the associated correspondence; (2) decentralized files in the main departments and in executives' offices; and (3) a record store which, for a number of reasons, was located at Beckenham, Kent, the home of their research laboratories.

In this case the work study officer decided that the most effective method of getting a complete picture was to start, not at the beginning, but at the end—in other words, at the record store, where all departments sent their non-current documents.

A target of two weeks was set for this part of the investigation. The work study officer began by considering the periods of retention—once again, on the principle of eliminating first and then improving. From the record store he obtained a full list of the types of document which it was holding, the amount of space occupied by each type, the department to which it belonged, and the frequency with which the documents had been referred to during the past two years. Armed with this information, he interviewed the manager of each department in

turn and asked him to go through the list "just to see if anything could be done." In almost every case the manager, with the full facts in front of him, suggested spontaneously that the period of retention should be halved or, at least, reduced considerably.

By the end of the first week, the record store had disposed of 13 tons of paper. This, it was calculated, represented about four million quarto sheets.

The work study officer was then in a position to consider ways of improving the store's lay-out and methods. Previously the documents had occupied 3,800 filing drawers; more than 40 per cent. of these were now redundant, and a judicious rearrangement of the remainder released for other purposes nearly 1,200 square feet of floor-space—about 40 per cent of the original area. The staff was reduced from five people to three.

More improvements were made a few months later when the company decided to reclaim the record store's remaining space at Beckenham by moving this section (now much more compact, of course) into the basement of their London offices. As a result, the staff was reduced to the ultimate level of one person—some achievement in an organization of this size.

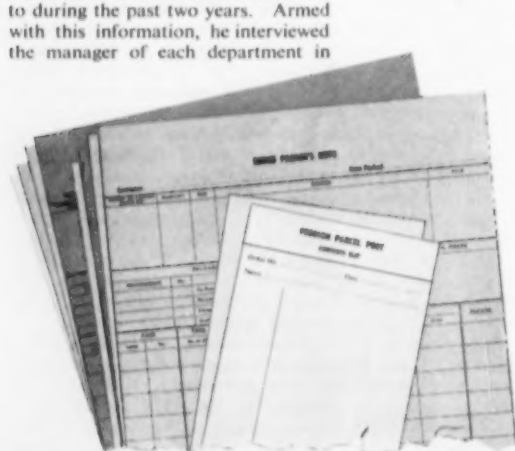
The investigation also encompassed the general files. Here, 88 four-drawer cabinets were reduced to 46, primarily because many documents could be fed into the record store at an earlier age without becoming relatively inaccessible. The redundant cabinets, all in first-class condition, re-equipped other offices, again saving a fairly heavy capital expenditure.

More often than not, the value of work study is the composite value of a number of comparatively small improvements. Here are three which contributed to the success of the filing project:

- 1—In the general files (which use neither pockets nor folders) the equivalent of seven drawers was saved by eliminating the cardboard spacers which divided into "months" the orders received from individual customers. No loss of efficiency was involved; often, it was found, a batch of 12 documents had as many as six spacers.
- 2—Also in the general files, the sorting trolleys were fitted with table tops and hinged flaps. This saved the space formerly occupied by four desks at which the filing clerks had sat during the relatively short period of each day when they undertook the preliminary sorting of documents.
- 3—An investigation in the new record store revealed that the top drawers were not being used because they were rather inaccessible. A specially-designed mobile ladder, costing £23, overcame this difficulty.

A third project is already in operation: an investigation of the home order routine. This, however, is a "marginal" project, much of the ground having been covered successfully by method study, and it is not expected to produce major savings.

One last point: none of the improvements resulting from the application of work study at the company's head office has involved any major capital expense.



Form re-design paid good dividends too. Following an investigation at the Dartford factory, three sets of packer's notes (left) were reduced to a much simpler two-part set (right).

# His Policy Was 'Never Take No for an Answer'



JOHN WILLIAM HOWLETT, O.B.E.

The successful career of John William Howlett, O.B.E., reflects his firm belief that if you get the right idea you should stick to it—even when other people hold entirely different ideas. By persistently applying this policy over a period of 40 years he has developed his business from a tiny garage into a specialized engineering firm with six factories and approximately 4,000 employees.

THE remarkable growth of Wellworthy Ltd., Lymington, manufacturers of piston rings, pistons, liners and other engine components, reveals the remarkable qualities of John William Howlett, O.B.E., the company's founder, chairman and managing director. At an early stage of his career, Mr. Howlett struck an unusually effective balance between his abilities as an engineer and his abilities as a businessman, and the events of the past 40 years reflect the skill with which he grasped far-reaching opportunities when they appeared, created opportunities when they didn't, and pursued a never-take-no-for-an-answer policy which met obstacles head-on and invariably overcame them.

Acknowledging these accomplishments, one suspects however that the company's success is largely the outcome of a defect—the blind spot which prevented him from assessing the magnitude of difficulties which some businessmen would have recognized immediately as insuperable. Had the young Mr. Howlett adopted Addison's dictum "make caution your elder brother," it is on the cards that Wellworthy, an internationally famous firm

with six factories and approximately 4,000 employees, would still be a garage in a small, mainly residential town on the South Coast.

Today "J.H." is a round-faced, energetic man who looks entirely at home with a fishing-rod in his hand or a shotgun under his arm. His opinions are forthright and he expresses them in a forthright manner. Seventy-two

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## By MICHAEL MELLOR

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this month, he carries his years lightly and still plays an extremely active role in the company's day-by-day operations.

The impact of his personality on the business is unmistakable and revealing. Equally revealing is its impact on the community in which the business has grown.

Mr. Howlett arrived at Lymington in 1912—a young man with a new job which was unlikely to excite anyone except himself. The town was small and strictly residential; there was no industry and no industrial resources—

not even a main railway line. Moreover, the 4,000-odd inhabitants were proud of the town's tranquility, character and traditions and many of them opposed vigorously any idea of industrial development.

Few businessmen would have regarded Lymington, 1912, as a suitable location for an enterprise on the lines which Wellworthy Ltd. have followed. But Mr. Howlett had "adopted" the town when a small opportunity arose, and he stuck to it when much greater opportunities appeared on the horizon. Many of his activities during the past 40 years have been governed by the same characteristic—which is usually described as obstinacy when it fails and consistency when it succeeds!

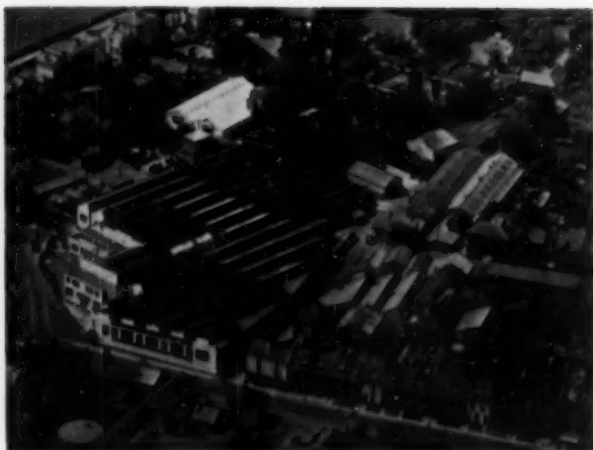
Today Wellworthy's factories cover approximately 20 acres and produce more than 500,000 piston rings a week. The Ampress factory, about one mile from the main works in the centre of Lymington, produces more than 40,000 pistons a week, and also manufactures the *Al-Fin* armoured groove piston, used in many engines which have to withstand particularly tough conditions. At Ringwood, the company have one of the best-equipped centrifugal foundries in the country.

How has the Borough of Lymington (present population about 26,000) accepted this assault on its tranquility? In 1924 Mr. Howlett became a member of the council. In 1930 he became the Mayor, holding this office for two successive years, at a time when the borough was enlarged considerably and exceptional qualities of tact and initiative were required from its leading citizen. In 1955 he was





*The persistence with which Mr. Howlett stuck to one idea—and one place—put Wellworthy on the map. Picture above shows the factory as it was in 1918; on the right is an aerial view of the main Radial Works today.*



made an honorary Freeman—the third person who has been honoured in this way during the borough's 805-year history—in recognition of his "contribution to the welfare and development of the borough over a period of many years . . ."

Chance brought him to Lymington in the first place. Born at Grantham and educated at Thetford, Norfolk, he left school when he was 13, served an apprenticeship with a local firm of steam engineers and studied engineering at Battersea and Woolwich Polytechnics. The young motor industry attracted him more than heavy engineering, and for the next few years he was employed in various capacities with a number of well-known car manufacturers, including Daimler, Austin and Armstrong Siddeley. Eventually he was offered, and accepted, the job of managing the South Coast Garage, Lymington, a slightly dilapidated sales and service depot which employed two men and a boy.

The motor car was already out of the luxury class (so there were good prospects on the sales side of the business) but was still a somewhat unreliable piece of machinery (which meant that the repair business was likely to increase too). Within a few years, however, Mr. Howlett had decided that the same opportunities could be approached more profitably from another angle. Selling and repairing cars was a steady business, but even greater reward awaited firms which concentrated on building greater reliability into the engines by producing components capable of withstanding more wear and tear than existing types.

This change in his plans was entirely

the result of the abnormal working conditions of the 1914-18 period—conditions which gave him new opportunities with one hand and nearly took everything back with the other.

For a few months, South Coast Garage was mainly engaged on vetting and repairing Army vehicles. Then Mr. Howlett decided that its modest machining facilities could be employed much more effectively on other work. At this stage of the war, Britain's stocks of 18lb. shells were dangerously low, so he set about the task of organizing local garages and workshops (everyone with a lathe, in fact) into a makeshift munitions "factory."

### *Interest Aroused*

This activity ended when some of the large engineering firms began to mass-produce 18lb. shells in adequate numbers. Mr. Howlett went to London in search of fresh contracts. Finding that Ministry of Munitions officials were singularly unimpressed by what he was offering, he approached them again with a largely imaginary list of machine tools and plant. This aroused their interest and he was given the job of making 10,000 piston rings.

More improvisation (plus the assistance of a friend, Mr. St. George Caulfield, who owned a well-equipped private workshop and, in fact, had been undertaking experimental and development work on aircraft engines) enabled Mr. Howlett to complete the order satisfactorily. It was during this period that he evolved the "controlled internal hammering" method of making piston rings. Technically one of the cornerstones of the Well-

worthy organization, this process gave true circularity and equal radial pressure.

The rings were required for the B.R.2, a new aircraft engine with rotating cylinders. When it was found that B.R.2 rings manufactured by South Coast Garage gave satisfactory results in this type of engine, Mr. Howlett was asked whether his firm could manufacture 200,000 of them.

This was a tough assignment for an unknown firm with very little capital. John Howlett promptly accepted it. Receiving an official "instruction to proceed" he put up another workshop and bought as much machinery as he could afford. The project was gathering momentum when the Armistice was signed. A few months later the instruction to proceed was cancelled.

The firm was nearly sunk. Mr. Howlett's first inclination was to return to the garaging business. To raise sufficient capital to pay off his debts, he tried to sell the internal hammering patent. No one wanted it—a fact which put his back up and convinced him that he should go on making piston rings himself.

By then Mr. Howlett had bought the controlling shares in the business at a very low figure. Realizing that the original title would scarcely prove an asset when he tried to sell manufactured goods to car-building firms, he evolved and registered the name "Wellworthy."

He approached Armstrong Siddeley, one of the companies which had been using B.R.2. rings made by South Coast Garage. The company recalled the quality of these rings, and gave him



the job of producing 10,000 rings for a new car which they were about to market. This contract put Wellworthy Ltd. on the road to success.

It was, of course, the straight and narrow road of specialization. Mr. Howlett decided to concentrate the company's resources in the field where the patent which he held gave him a technical lead, rather than attempt to produce a wide range of engine components. Soon Wellworthy began to prosper. Their factory—originally riding stables—became inadequate. Nearby cottages were bought and pulled down and the first of a series of modern machine shops was erected. More land was acquired in anticipation of the expansion which, it seemed, was imminent.

In the early 'thirties, the tempo of the business was increased by the introduction of a new marketing policy. During their initial period of development, Wellworthy had adopted the policy of supplying rings only to engine manufacturers; meanwhile, their competitors were supplying a substantial portion of the replacement trade by making long-term "exclusive" contracts with the factors through which all replacement rings were marketed at that time.

Mr. Howlett decided that the only way in which his company could penetrate the expanding replacement trade was to set up his own marketing organization—a method of selling which had often proved unsatisfactory when used by manufacturers in allied fields. To test its possibilities, he established a sales and service branch in S.E. London.

The obvious value of an immediate delivery service was supplemented by employing a staff of technical advisers and (later) by providing an on-the-spot adjustment and piston-reconditioning service. As soon as the experiment in London had proved successful, Mr. Howlett began to establish branches in other parts of the United Kingdom and also in Eire. (Since the war the sales organization, incorporating 33 branches, has operated as a subsidiary of the present holding company; moreover, it now handles a variety of spares made by other firms, experience having shown that customers like to obtain all their replacements from one source.)

*The policy of specialization paid big dividends—today the firm's name is virtually synonymous with piston rings. But Wellworthy also manufacture a variety of components for engines of all types and sizes*

While visiting Germany in 1937, Mr. Howlett became firmly convinced that war was imminent, and he returned to Britain with an almost apocalyptic desire to make the authorities sit up and take notice. Unable to secure any official support, he decided that the company should make provision on their own account to meet the heavy demand for pistons and piston rings which war would entail. Consequently, a new factory was built, with the company's own capital and labour, on land which they already possessed at Ampress, near Lymington. It was finished and put into operation on a limited scale in the early months of 1939.

### Shadow Factories

When the Ministry of Aircraft Production was formed in 1940, Wellworthy concentrated on the manufacture of aircraft pistons and rings. The new Ampress Works were expanded and shadow factories were set up in two other locations; eventually the company were operating six production centres and employing 7,000 workers.

During the war, Mr. Howlett was almost wholly engaged on official duties. When Lord Beaverbrook and others set in motion the Emergency Services Organization, he was given the job of establishing this scheme in the Southern Region.

Later, he became Regional Controller, Ministry of Production, Southern Region. In this capacity, he visited practically every production factory in the five counties which the region covered. He also took the chair at weekly meetings in Reading, attended

by the Regional Controllers of other Ministries.

After two and half years of this voluntary full-time job, he saw the necessity of returning to his own organization, and his resignation was accepted by the Minister. But he continued to serve, either as chairman or vice-chairman, on the southern Regional Board for Industry, which was created subsequently.

Throughout the war and during his time as Regional Controller, he almost invariably spent his weekends at Lymington, discussing production matters with his executives and helping to plan forthcoming operations. With his deputy managing director, he visited the U.S.A. at the request of Sir Stafford Cripps, to make available to the American aircraft industry the special alloy D.T.D.485, of which he is joint patentee—another of Wellworthy's important technical developments in which he has played an active part.

Almost immediately after the war Wellworthy (which had become a public company in 1936) amalgamated with two other companies manufacturing similar components.

The company's technical and commercial progress over the years reveals several facets of John Howlett's character. Another facet is picked out by the excellence of their labour relations. Since their inception, Wellworthy have been virtually free from industrial disputes—and this is not due entirely to the fact that they are drawing on a pool of engineering labour which they created themselves and, until quite recently, monopolized.

John Howlett has the advantage of commanding his employees' respect by

*Continued on page 175*



# MANAGEMENT AT WORK

## FACTS ABOUT FIGURES

FOR many years the General Electric Co. Ltd. have made extensive use of statistical quality control (see *BUSINESS*, October 1955 issue, page 110) and other statistical methods. They have also taken steps to ensure that the purpose and value of these methods are appreciated by the employees whom they concern.

Last month the company took this policy one step further by introducing a course of lectures on the statistical analysis and presentation of data within their organization. The lectures are being given by Miss Joan Keen, who is in charge of the statistical service group at G.E.C.'s research laboratories.

The first part of the course, now under way, deals with some of the quality control techniques which assist production and inspection. Members of the staff employed on this work are taking it, as well as those employed on research and development. Subjects covered by the lectures and practical sessions include the study of distributions, the use and computation of standard deviations, and sampling inspection schemes.

The second part of the course, to be held in about five months time, will deal with more advanced subjects likely to help development, technical and research workers.

For employees from the company's works and the laboratories in the provinces, the course is held on five consecutive days. Employees in the London area attend on one day a week for five consecutive weeks.

The number of people who have asked to attend has been encouraging, and the company will probably organize further courses in the future.

## YOUTH TAKES OVER

THE AMERICAN CAN CO., which has factories in St. Louis, Portland, and Hoopeston, Illinois, have adopted an ingenious system of arousing the interest of local schoolchildren who may eventually seek jobs with them.

In each area the factory manager has made arrangements for some of his executives to give daily lectures to a class of senior high school pupils. The lectures are spread over a period of between three and six weeks, and are supplemented by visits to the

company's own works, and to the factories of firms which use their products.

The course reaches its climax when the pupils take over "managerial" positions at the plant for a whole day. "Sitting in" with the plant manager, departmental managers, supervisors and other key personnel, they actually assist in handling routine correspondence, preparing reports, and taking and making telephone calls.

Similar ideas have been put into effect recently by other American firms which run students-in-industry programmes. Whether or not it should be regarded as a "stunt" from the training angle, it has the merit of improving relations between the company and the up-and-coming members of the community. Moreover, it earns the goodwill—obviously important—of local educational authorities.

## SATURDAY AT HOME

A LARGE-SCALE "At Home" was held recently at the Exide Works, Clifton Park, near Manchester. About 2,600 guests—wives, relatives and friends of employees—made a go-as-you-please tour of all manufacturing departments.

Production was not slowed down, because the "At Home," which had been suggested by the employees themselves, was held on a Saturday afternoon. Nevertheless, the visitors saw the works in action; more than 150 employees voluntarily manned the machines.

There were no official guides. The works had been carefully signposted,

indicating a route which led visitors through the more interesting departments and past all the working machines. In every shop, large posters indicated clearly what each operator and each machine were doing. Employees looked after their own families and friends and explained informally the significance of the work that was going on.

Before starting the tour, the visitors passed through the works' dining room, where there was an exhibition of some of the many types of battery made by Exide. Afterwards, they had tea in the canteen.

The visitors came by train from the Manchester and Bolton districts, and buses ran a shuttle service to the factory. So great was the response when the idea was announced that the list of applications for invitations had to be closed some time in advance.

## NO COLD FEET

AN unusual feature of the new show-rooms which Burton & Deakin Ltd., have opened at their Orpington, Kent, garage, is the use of an electric floor-warming system. An area of 1,440 sq. ft. is heated by mineral-insulated cables laid in the concrete screed. The installation is automatically-controlled, and the current is switched on only at night. During the day, the floor and the ground below it act as a heat store.

The warm-floor system of space-heating is already used in some commercial and industrial buildings, and also in a block of flats. This, however, is the first time that it has been incorporated in a garage building.

It has a number of advantages. The heat is distributed evenly without causing draughts, and the entire floor-space is unobstructed by radi-



*Volunteers manned the machines during Exide's Saturday "At Home"*



*Linsing Bagnall are boosting their export sales by giving on-the-spot demonstrations at European factories. Here the demonstration unit is being loaded on to the cross-channel ferry*

ators or convectors. Moreover, the system has a remarkably low-power-consumption once the floor has reached its optimum temperature, and takes advantage of the off-peak electricity charges which apply in most districts.

To conserve the heat as far as possible, the new showroom makes full use of insulated material, including double-glazed windows. These have the additional advantage of not becoming obscured by condensation in cold weather.

## EXPORT LIFT

**E**XPERIENCE has convinced Linsing Bagnall Ltd., Basingstoke, that the most effective way of selling mechanical handling in general, and their own mechanical handling equipment in particular, is to give demonstrations under actual working conditions at the factories of prospective customers, using the prospects' own products as the loads. For this purpose they employ a fleet of specially-built demonstration lorries.

Now they are adopting a similar policy in the export field. Loaded with specimens of the company's range of fork-lift trucks and other equipment, and accompanied by a team of skilled operators, one of the special lorries has embarked on an overseas tour covering the main industrial centres of France, Belgium and Holland.

Demonstrations will be given at many works and factories in these countries. The company's established distributors are co-operating in the venture.

The lorry, like other vehicles in the fleet, has an ingenious tailboard which, in two actions, places the truck to be unloaded at ground-level. First, the tailboard swings into the horizontal

position, making an extension at lorry-loading level, on to which the truck is driven. Then the tailboard is lowered hydraulically to ground-level.

Linsing Bagnall believe that their enterprise in arranging the tour will impress Continental firms—thus strengthening the effect of the on-the-spot demonstrations.

## BACK TO SCHOOL

**L**OWE BROS. AND CO. LTD., builders' merchants, believe that they are the first firm in their type of business to make use of the Ministry of Labour's Training Within Industry scheme.

At the suggestion of Divisional Director W. S. Shirra, the managers of eight departments at the company's Birmingham works recently made up a T.W.I. class. The departments concerned were transport, catering equipment, casement, paint, sanitary, brass, grate and range, and builders.

For five days the group spent two hours a day with a Ministry instructor. Their individual supervisory experience ranged from 12 months to 34 years. All agreed that the training was worth-while.

The course covered many management subjects, and emphasis was placed on the importance of passing on specialized knowledge to other members of the firm.

## T.V. ON ICE

**N**EW application of industrial T.V. is revealed by the Bristol Aeroplane Co. During de-icing tests on the company's *Proteus* turbo-prop engine—the power unit for the Britannia Air Liner—a small T.V. camera mounted in the port engine nacelle of the "flying test-bed" relayed pictures

to a 14in. screen inside the aircraft. Thus, technicians were able to watch effects of the de-icing tests while these were actually in progress.

Much time was saved. The tests, part of the programme for the Britannia's certificate of airworthiness, were completed in only 20 hours' flying time. Without T.V., at least 120 hours would have been necessary. Even the use of a cine camera would have been a comparatively slow procedure, since it would have been necessary to process and examine the film record after each stage of the tests before going any further.

Fan-cooled and flexibly-supported, the miniature camera completed this job without even having the cathode tube replaced—a tribute to the engine's freedom from vibration, but also an indication of the toughness of industrial T.V. equipment.

## Reviews in Brief

**Eltinger (Bowes & Bowes) 15s.** The author, with a leading reputation in financial journalism, starts with the assumption that his readers know nothing at all about investment. After taking them gently through a few explanatory chapters, he goes on to describe his techniques for using charts as a guide to investment policy. This book is a very good investment for potential investors in stocks and shares.

**STUDIES IN COMMUNICATION (Secker & Warburg) 21s.** This is the first work to be published by the Communications Research Centre set up in 1953 at University College, London. One chapter, by Sir Geoffrey Vickers, discusses "Communication in Economic Systems." The others range through biology, medicine, the arts and other fields. The reader should not expect to find in this book any quick answers to his problems of communications in industry, but the book should certainly prove a stimulant and, to many, an eye-opener, revealing for example, something of the tremendous variety of shades of interpretation which may be put on any one message.

**THE FUTURE OF AMERICAN Prosperity by P. Wernette (Macmillan) 24s. 6d.** A very easy-to-read economic text illustrated with ample tables showing the trend of business over the years, and forecasting a further major expansion of the American economy, but also pointing to danger signs. Incidentally, a very fair analysis of Britain's economic situation is used to point to trends in the United States.

**MODERN SALES CONTROL by A. W. Willmore (Pitman) 15s.** The title does not do justice to the text, which contains many valuable suggestions on how to work a sales territory—whether selling to retailers or to industry—as well as on how to control a sales force.

**THE BUSINESS WORLD by E. Sladden (Pitman) 6s. 6d.** An elementary text suitable for recommending to new members of the junior staff.

**ADVERTISERS' AID (Newspaper Society, 6 Carmelite St., E.C.4) 21s.** (Map supplement, 5s. extra.) A comprehensive guide to newspaper advertising facilities.

**TAXATION OF PROFITS AND INCOME (F.B.I., 21 Tothill St., S.W.) 1s.** A digest of the reports of the Royal Commission and the two Millard Tucker committees.

## How to Pick and Train SPECIALITY SALESMEN

**A**SK a speciality salesman what he thinks of commercial travellers, and he will say contemptuously, "Order-takers!" Similarly, ask a traveller for a well-known house what is his opinion of speciality salesmen. He will look down his nose and mutter, "Door-knockers!"

My job is speciality selling, and while I acknowledge that there are salesmen going from door to door with a smooth line of talk and one article which they are determined to sell, speciality selling generally involves much more than door-knocking and a glib tongue. Moreover, its importance to the nation grows every year, as new and better products come on to the market in rapidly increasing numbers.

The speciality salesman is sometimes accused of endeavouring to persuade people to buy articles they could really manage without. Whether that is true depends largely on one's idea of progress. For example, I am interested in one line only—commercial refrigeration. And I believe that inevitably the answer to the world shortage of food lies in proper and adequate refrigeration. Frankly, I am well "sold" on my job and my company's products—but so are many other speciality salesmen. It is essential that they should be.

The first requirement in our business is to create a need for our products, and the only sure way is for the salesman to call, not just anywhere, but everywhere. What applies in my industry applies in many others. Every week some new application is being found for our products, and only by salesmen calling everywhere can this fact come to light and more

Practical methods of building up and maintaining an efficient sales force are described here by an area sales manager of a company manufacturing commercial refrigeration equipment. He emphasizes the value of \*recruiting inexperienced men with the right personality and the right attitude towards salesmanship \*teaching them that "honest" selling is the best policy and \*making sure that they really understand their customers' lines of business.

business result. So my object has been to build up a sales force who will follow exactly this policy.

The "mortality" rate among speciality salesmen is high compared with most other types of occupation, mainly because the speciality salesman is always looking for the lush pastures—and it always seems greener in the

brilliant salesman has usually become a sales director or has gone into business on his own account. If he is still on the road, he is hard to handle and invariably works in his own good time. For him it is true that you cannot teach an old dog new tricks.

I prefer to take men from the well-known correspondence sales schools. In this way one obtains men who, first of all, have the urge to sell, and secondly, have shown initiative by doing something concrete about it. I have in my team at present former clerks, shop assistants, a car-hire driver, an estate agent and a builder. All of them have taken a correspondence course in their spare time while still employed in their previous jobs, and all of them are now good salesmen. Each is more than earning his keep, and indeed is far happier than in his previous occupation.

My main requirements in a new salesman are that he should be quick-witted and above average intelligence. The questions I ask at an interview are concerned mainly with news and sport, and sometimes with politics. I try to find the hobby in which the applicant is most interested, and of course ask if he has done any previous selling.

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### By R. O. ROBINSON

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next field! Each year many change their jobs, and some even go out of selling altogether.

I find, therefore, that the best way to build up a fairly stable sales force is not to rely on ready-trained salesmen or even to take on experienced salesmen at all, but to train raw material. I do not believe in the old adage that a salesman is born and not trained. That may have applied in the past, when all that was necessary was a glib tongue. To-day, with a far more educated population, the salesman must have behind him the benefit of good, sound training.

The "born salesman" is, I find, more trouble than he is worth. A



In any case, I tell him to try to sell me the type of product in which he is most interested. For instance, if his hobby is motoring, then I tell him to imagine that he has a certain car for sale and that I am a potential buyer.

If he can carry out the pretence of selling a car to me, can answer my questions quickly, and can argue, I am satisfied. One part of a salesman's make-up is to act. (But not, as is sometimes thought, to act a lie.)

There are three essentials in good selling—enthusiasm, honesty and sincerity. Enthusiasm we must all have if we are to succeed. Honesty, of course, means more than just being truthful. For example, in my business we can sell a grocer, say, a refrigerated display case, and we can claim to another potential customer that the first man's weekly sales of sausages have gone up by 900 per cent. This may be true without being honest: the first grocer may have sold only 2lb. of sausages per week before he had refrigeration because he knew he could not keep them, and in his first week with his display case he may have sold 20lb. How much better just to say that he is now able to sell additional lines, and so increase his turnover and goodwill.

Furthermore, it is so much easier for a salesman to remember what he said last time if he was honest. He can use his memory for facts and customers' faces—not to remember the lies he told on a previous visit!

Sincerity is essential too. If a man is sincere he is halfway to a sale, because it will be apparent to his customer that all he wants is to sell him the right thing. For speciality salesmen the problem here is different from what it is for commercial travellers. If a traveller sells a grocer too much salt, for example, at one call, his next call will be abortive and there may be no future calls. Thus he may suffer directly for his folly. But with a speciality salesman selling an article that may last several years before it is replaced, there is a danger of a dishonest salesman selling the wrong size, or even the wrong type of equipment—especially if it so happens that he can get quicker delivery of the wrong type.

The new recruit to my staff must first of all be taught to understand our product. So part of his training is at the factory, where he can see all stages of manufacture and learn how and why refrigerators work. Automatic electric refrigeration is fairly simple to understand, but it is surprising how few of its users know what it is all about.

At the next stage the recruit must



#### FOOD, FURS and FLOWERS

*The speciality salesman must know his customers' business problems as well as he knows the qualities and performance of his own products. Refrigeration, for example, is used for storing such diverse products as food, furs and flowers*



memorize as many as possible of the prices and details of the various models which we have to offer. I feel there is nothing worse than the salesman who demonstrates a model and, on being asked the price, has to refer to his book. A man who takes his time finding the price will shock the potential customer when he finally gives it, so that the price is all that he remembers of the demonstration. Tell it to him easily whilst you are extolling the virtues of the particular model, and he will appreciate the value offered.

Again, the man who can remember all the details of his products will give a far more polished performance than the man who is trying to read one paragraph of his pamphlet ahead of his prospect. Detailed knowledge is vital, and the good salesman never stops learning. Moreover, in my particular business, at least, he must know as

much as possible of his customer's business.

While I allocate a fortnight to teaching my embryo salesman what I have learned about other people's businesses and how we can help them with refrigeration, I believe this is best learned on the road. In my experience customers and potential customers are only too willing to tell us about their problems and requirements. For example, we sell "freezer coldrooms" to butchers. Every butcher has a chiller coldroom for the day-to-day service of meat, but few have "freezers" for long-term storage, preferring to buy from day to day. But there are definite advantages in having freezers. So when I was on the road I would say to a butcher: "A number of people are buying freezer coldrooms these days. Why is that?" And I

*Continued on page 176*



# Getting the Best Out of Visual Aids

**I**N two previous articles, the best methods of written and spoken communication were described by experts. Alas, there are no experts in visual communication for internal use. The executive has to rely on his own judgment in most aspects of this tricky subject.

Most visual work is inevitably impersonal. How many works posters have any human touch? How many charts have eye appeal, let alone human interest? In my experience it is extremely hard to put over management's ideas to workers visually. The more intelligent the employees concerned, the harder it is.

In addressing the general public by poster or showcard, repetition can be relied upon to help lodge the message in the reader's consciousness. But this does not apply within the factory. On the street you address a free and willing reader; in the factory you buttonhole an often unwilling and semi-captive reader.

There is a further technical difficulty. The man walking to his office, the woman doing her shopping, sees your poster or showcard at most for a moment once or twice a day. The worker in your factory is—or may be—confronted by it every time he crosses the shop. Inevitably he gets sick of the sight of it. So one of two things happens, the scientists tell us. Either he hates it—and its author—or he deals with it through "feedback" and never perceives it consciously again. Either way, the failure to communicate is complete.

Often, however, visual or pictorial methods are the best available. An exhaustive survey undertaken for the United States Navy on the efficiency of films as a training method, compared to spoken instruction, revealed that men remembered far more of the simple instructions when they were put over by films than by word-of-mouth.

The visual method, therefore, can sometimes have three main advantages as compared to the written or spoken method.

1. It can be more effective.
2. It can be more attractive.
3. It may be the best medium to use when communicating to people of a low educational standard.

The last war played an important part in popularizing the use of films for training, building morale, and for public relations. In Britain, the larger companies have tended to produce far more films since the war. The introduction of commercial television will certainly lead to industry making still more films, especially for advertising and public relations.

"How much will it cost?" is one of the first questions to be asked when a company is considering making a film. Another important question will be, "Who is going to make it?" The names of film companies who specialize in making industrial films can be obtained from the Association of Specialized Film Producers, and from the Central Office of Information, Films Division. (Also an article on Page 77 of the October issue of

BUSINESS described the experiences of firms that have successfully made their own films.)

The producer is unlikely to be able to provide an estimate of the cost of a film until a "treatment" (or description of the proposed content of the film) and a "shooting script" have been prepared. The cost of these is generally quite modest, and from them a firm estimate can be given.

In certain cases, however, there may be no need for a firm to make their own films. A large number of excellent films on industrial subjects can be borrowed or hired from such organizations as the Central Office of Information, the United States Information Services, and the G.B. Film Division.

At Fords we have used a number of films and we have made a few of our own. With a labour force of 42,000, I budget to spend about £5,000 to

\*"Communication in Industry," edited by Cecil Chisholm and published by Business Publications Ltd., 180 Fleet Street, E.C.4, at 35s.

By M. J. BUCKMASTER

Public Relations Officer, Ford Motor Co.

Although the use of pictures and symbols is one of the oldest means of communication known to man, their application in industry is often indiscriminate. In this article, the third which BUSINESS has arranged to reprint from the new book "Communication in Industry,"\* an executive of the Ford Motor Co. explains how firms can get the best results from visual communications.

£6,000 on an internal film for training or morale. For a smaller film I should spend proportionately less, but for a public relations film we are prepared to pay very much more. The public relations film not only reaches 10 or 20 times as many people, but is also likely to assist in building morale in the factory.

The Ford film that has attracted most attention in both fields is "Opus 65." So ambitious a project is naturally expensive. I budgeted £10,000 for



"Employees see that stockholders are ordinary people"

"Opus 65"; the film eventually cost us £11,000. It meant a camera team at the works for a few weeks. It meant occasional hold-ups of work while the cameras wheeled round the shops. It meant four sessions with the London Symphony Orchestra. But it was well worth it in the end. In what other way can you make such a direct and dramatic impact on employees and a large public with a single project?

In spite of all such happy experiences, I value the film far more highly as a means of public than of internal communication. First, the film is a curiously impersonal medium—there is nothing really human about it. Second, it dates very quickly. Third, and most defeating, it is extremely difficult to find a time and place for showing such a film. You cannot show it in working hours without loss of production; you cannot show it on a Saturday because nobody will bother to come. Fourth, the film is expensive in proportion to its possible service to internal relations.

A much cheaper idea is the sound film-strip. This method can be seen at its best in the case studies produced by the Industrial Welfare Society. These film-strips, with synchronized records, reconstruct actual incidents occurring

in factories, shops and offices. The stories they tell deal with either human relations or administration problems. These case studies are admirable for discussion by management or supervisory groups.

Another good example of visual training is that of the recent films and film-strips which have been produced by the British Association for Commercial and Industrial Education. Their two productions, "First Impressions," and "Supervise With Care," are obtainable as film-strips or as films, and are an excellent means of promoting discussion on human relations subjects.

The mere showing of a film or film-strip, while stimulating interest, will not necessarily teach the lesson to be learnt. Nor is it a substitute for personal instruction. The instructor who is showing the film-strip should have a full understanding of the subject. It is best for him to begin by giving the group an idea of the subject of the film, explaining why it is being shown. The film should be followed by a discussion. If necessary the instructor should stimulate discussion by asking questions and helping the group to draw the necessary conclusions.

Posters and notice boards are used by a large number of firms. The localities for the boards are generally at central positions, in canteens, or near clocking-in and checking-out points.

### The Wrong Place

Some hints on the best use of notice boards are contained in a survey on joint consultation by the National Institute of Industrial Psychology. Their report states:

"So little thought was given to the position of notice boards by many firms that they placed them by the time clocks. This virtually ensured that notices posted on them would not be read, for there tends to be a crowd around the time clocks in the morning, while at closing time people rush past them. One firm with two geographically separated sections had the minutes posted by the time clocks in one section and in a central position in the other. It was found that there was considerably more interest shown in the section where they were centrally posted. A significant association was found between the interest of the workers and the practice of posting minutes on the notice boards."<sup>1</sup>

<sup>1</sup> "JOINT CONSULTATION IN BRITISH INDUSTRY," National Institute of Industrial Psychology, Staples Press, 1952.

Provided that the material is changed frequently, and that it is attractive and readable, employees will get into the habit of looking at notice boards. The poster technique has proved its usefulness for advertising purposes, and there is no reason to suppose that, handled efficiently, it should not also make a useful contribution to industrial communication.

Suggestion schemes and safety are two frequent subjects for use in posters. In the Esso Petroleum Company, posters of this type are designed by employees. Competitions are held in order to obtain the best ideas for designs. Although the posters are drawn by professional artists, they carry the name of the employee who designed them. The competition creates a good deal of interest in the subject, and the fact that the posters carry such inscriptions as "Designed by Driver Joe Smith" helps to dispel any impression that the publicity is coming from an impersonal source at head office.

Charts are used frequently in training programmes to illustrate important points arising during the course of lectures or discussions. But it is important to ensure that the point which



Posters are designed by employees

you need to put over *really* deserves a chart. Three useful rules to remember in preparing charts are that they should be simple, portray one idea, and be capable of only one interpretation.

A common fallacy about charts is that they can be used without verbal explanation. As Flesch says:

"Unfortunately, the idea that you can explain things without explaining them in words is pure superstition. A favourite proverb of the picture and diagram lovers is, 'One picture is worth more than a thousand words.' It simply is not so. Try to teach

people with a picture and you may find that you need a thousand words to tell them exactly what to look at and why."<sup>1</sup>

Pictures can be of great assistance in helping you to write or say something. The charts or drawings, however, must be supported by clear captions or a comprehensive text. Well-prepared visual aids can be particularly useful in training programmes. They sometimes have more impact than the lecturer's voice, and they do break up the monotony of a long lecture.

The interpretation of complex graphs often demands training and experience. Graphs should therefore be made as simple as possible if they are to be used in such media as annual reports which go to all employees.

Visits to other parts of the company can help employees to understand the relationship of their own jobs to those of other employees, and also to give them a better overall picture of the company's operations. Personal contacts established during the visits can be instrumental in building good morale and co-operation.

"Open House" programmes are used effectively by certain companies who permit families and friends of employees to visit the firm, generally during weekends. In 1950, British Nylon Spinners instituted an "At Home" week during which the factory was thrown open to employees who wished to bring their relatives to see their places of work.

## Employee Guides

Employees were allowed to bring two relatives, acting as their host and guide for the afternoon. The route through the factory enabled each employee to show his relatives exactly where he worked; visitors thus had the opportunity of seeing a great deal of the working process in addition to factory amenities such as canteens, the surgery, gardens, and recreational facilities.

Another interesting "Open House" experiment was carried out by British Insulated Callender's Cables, who are one of the pioneers of holding stockholders' meetings at works. After the meetings, stockholders are conducted around different sections of the works.

The reaction of both stockholders and employees to these visits has been excellent. Stockholders are impressed by the enterprise, and on the employees' side the visits are helpful in

promoting a better understanding of the part played by those who put up the capital. Employees see that stockholders, on the average, are ordinary people like themselves. B.I.C.C. say that they know of no adverse reactions arising from such meetings.

At Fords we have found company visits a most efficient form of communication. Here is the visual method that has all the advantages claimed for it. It is direct and personal; it brings in the workers' families; it need not be too costly. When it was known that the Queen would pass our works during the voyage of the Royal Yacht up the Thames, on her return from her Commonwealth tour, we invited our employees' children of school age to come along and view the occasion.

The success of any kind of visit or tour depends on careful preparation. The following points should be studied when arranging this type of programme:

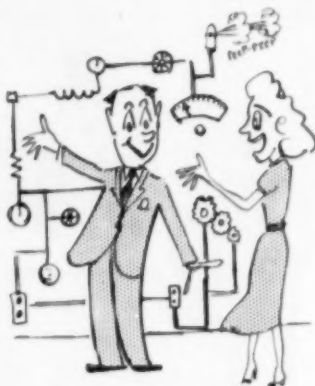
1. Plan all arrangements carefully.
2. Inform people about the visit well in advance.
3. Plan the tour itinerary in detail.
4. Make the groups as small as possible.
5. Tell the group what you are going to show them.
6. Choose the right time to make the tour.
7. Tell the group what to watch for.
8. Avoid distractions when making the tour; keep to your itinerary.
9. Allow questions at the end of the tour.

Inevitably, we are far behind America in the use of the newest medium of communication—television. Since this is the first new medium available for 30 years, the possibilities for the pioneers should be interesting. In the U.S. the impact of the first closed circuit telesemissions for salesmen and consumers was tremendous. But so was the cost. However, in our smaller country, it may well be possible to use the medium less expensively.

We at Fords have pioneered closed circuit programmes in this country. In June 1954, we used a closed circuit for a sales conference at the Crystal Palace. In this way we were able to bring our new tractors to our guests instead of taking our guests to the tractors. Our guests were executives of overseas Ford companies attending a four-day sales conference. We staged two "live" programmes before cameras at a site some quarter of a mile from the hall. The programmes were transmitted to the audience on 12 television sets used in closed circuit in the lecture hall.

A month later we again used a closed

circuit to explain some of our factory methods at the Production Exhibition at Olympia. As it was impossible to transfer certain of our larger machines from Dagenham to show how mechanization reduces human labour, we televised them instead. Attendances at the stand rose to 400 an hour during the seven-day exhibition, and an average of 350 people attended each of the thrice daily television programmes.



"Open House" programmes can be effective

Admittedly, our telesemissions were television on the grand scale. They cost a lot of money, time and work. But it is possible to use the closed circuit on a very modest scale in this country. Several leading advertising agencies have experimented during 1955 with such sessions, even for individual shops. By concentrating on one product or theme in one area, an agency was able to attract and fascinate large crowds—in one case (a dress show) 800 inside the hall and a crowd of 200 outside—at costs ranging from £200 to £2,000.

Clearly, the same technique can be used at a sales conference, a management meeting or a product demonstration. There are already three organizations which hire equipment and personnel for this work at a charge of £50 a day. This includes the camera, sound and lighting equipment, cameraman and crew, plus transport to and from the place of exhibition.

Television sets can be hired or obtained from a manufacturer on a reciprocal publicity basis. Up to 15 sets can safely be used on a normal circuit, says TV expert A. J. Hayward Costa. A personality to compere the show will cost anything from £30 to £120, according to popularity or star value.

<sup>1</sup> "The Art of Readable Writing," Harper & Bros., 1949.

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*See-*

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*Garage with conventional lighting. Note the confusion of beams, pipes, trunking, wiring and light fittings.*



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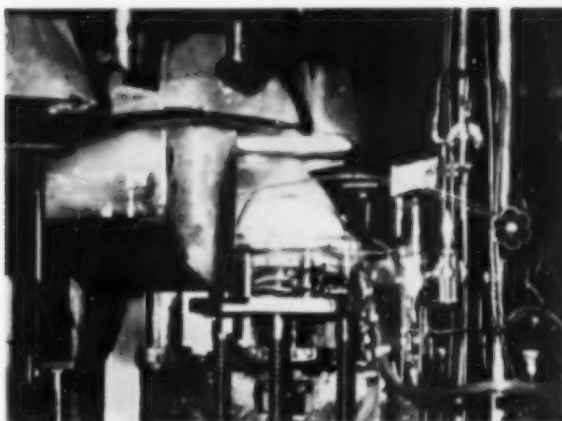


TGA 17  
BUSINESS





1 The cutter snipping off the required amount of glass for a television screen with a pair of shears. In spite of the fact that the cutting is done by hand, a tolerance of plus or minus 2 per cent is obtained.



2 In addition to the continuous furnaces that produce the molten glass, the actual moulding of the cones and screens is done by machinery at the rate of approximately one every six seconds.

## 'Business' Picture Story

# Craftsmanship Still Needed

Production of television tube cones and screens at the Ravenshead works of Pilkington Bros., provides a striking example of how, in an age when automation is so much talked of, individual craftsmanship is still very much in demand. Although Pilkington's are using the latest automatic machinery obtainable in Britain, from the United States and from the Continent, and are gradually mechanizing more and more processes, there are still many in which no suitable substitutes have been found for the human hand and eye. One of the prices we pay for progress, is that new industries generally require in their early stages, a high proportion of labour in their production. Only later is it possible to develop appropriate machines, controls and inspection equipment for nearly all stages.



3 When sufficiently cool, cones are removed from the mould and placed in this 120ft.-long "lehr," or annealing furnace, in which the temperature is slowly lowered, to reduce strain in the glass, as the cones move forward to the other end. A high degree of skill is needed to carry the glowing-hot cones from the mould to the lehr.



**4** Close examination of a suspected fault through a polariscope. Strains, stones and flaws show up in vivid colours against polarised light. Waste glass is returned to the melting tank. In the early stages of inspection, standards are so high that up to 50 or 60 per cent of output may be rejected.

**5** Surfaces of the screens being ground. This is done to remove slight moulding marks which are indicated by the examiners placing chalk marks on the surface of the screens.



**6** After grinding, screens are polished carefully by individual operatives.



**7** Even at the packing stage, individual attention must be given. Any surplus polishing element is removed by a soft duster to produce a clear finished screen.



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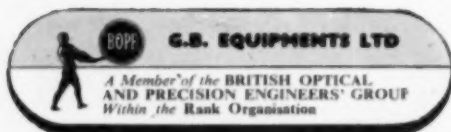
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# Magnetic Striping

## *How it Aids Overseas Publicity*

By A. G. THOMSON

A new, economical system of sound-on-film recording (mentioned in last month's opening article) has special advantages for firms who wish to show sales and publicity films in a number of foreign-language markets. This article describes the system fully, and reveals how one organization are using it.

FOR many years there has been only one method of adding sound to motion pictures—reproducing it optically in the form of a saw-tooth or "ladder" track on the edge of the film. This is, inevitably, a complicated and rather expensive process which has to be undertaken by experienced technicians with full studio facilities if the results are to reach professional standards. So far as industrial film users are concerned, its use is seldom justified economically unless the films are aimed at relatively large audiences.

Now available, however, is a simpler and much cheaper system of sound recording known as magnetic striping. This system, mentioned briefly in the opening article in the October issue of *Business*, enables even small film units to produce high-quality soundtracks without calling on the services of an outside studio.

Basis of the system is a "stripe" of magnetic substance applied to the edge of the film after it has been developed and edited. On 16mm. film, a stripe which covers the whole of the area normally occupied by an optical soundtrack is termed "full striping." Alternatively, a half stripe may be added on either side of the centre line of an existing optical track, so that the latter can be played at a slightly reduced level. It is also possible to add a narrow stripe to the outside edge of double-perforated (silent) film.

The stripes have the same character-

istics as magnetic tape, but are stronger and more durable. Main advantage is that there is complete synchronization between sound and picture—unobtainable when the sound is recorded on an independent (unperforated) tape.

Copies of an optical track film can be half-striped at a very low cost. This allows commentaries to be varied without altering the original music and sound effects. Separate recordings can be made on the optical and magnetic tracks.

Using 16mm. film it is impossible to obtain high-quality sound from an optically-recorded track because the speed with which the film travels through the projector (36ft. per minute at 24 frames per second, or 24 ft. per minute at 16 frames per second) restricts the range of frequencies which can be reproduced satisfactorily. On the other hand, sound from a 16mm. magnetically striped film matches the quality of good optically-recorded sound on 35mm. film.

### *Low Cost*

Striping is used extensively in France and the United States. The technique was not made available to film users in Britain, however, until about three years ago. At present, several manufacturers are marketing projectors capable of reproducing magnetic tracks and (in most cases) optical tracks as well. The process of applying the stripe itself is being undertaken by

firms specializing in this work, and costs 1½d. per foot.

Magnetic-optical projectors allow inexperienced commentators to produce recordings of a high standard. Should a mistake be made while recording, the operator merely reverses the projector to a point preceding the error and re-records the appropriate passage of the commentary, the previous recording being automatically erased.

A case-history in last month's article (page 79) described the production of inexpensive magnetic sound films by a small film unit. Here is a contrasting case-history which shows how this process is being used effectively by the film unit of a large organization with subsidiaries all over the world.

The Shell Petroleum Co. Ltd., makes recommendations to the many companies established in different parts of the world to market the products of the Shell Group. Its film unit was started in 1935 and is probably the oldest established documentary unit in existence. Since it is constituted within the Public Relations Department, the films it produces are concerned for the most part with public relations rather than sales promotion.

### *Advantages*

It is obviously a great advantage to present films in the language of the country in which they are shown. Apart from the cost factor, however, a formidable administrative problem would be presented if films for all Shell marketing companies were produced in Britain with recordings in the appropriate dialects. There are also advantages in giving encouragement to local film industries by dispersing film making, as well as film usage, to the fullest extent consistent with the maintenance of quality.

For these reasons, the general policy of the Shell film unit is that each company should be encouraged to make its own commentaries. An exception is made in the case of Latin America, since a single commentary in Spanish, suitable for use in a number of different countries, can conveniently be made in London.

For many years versions with commentaries in other languages were produced by normal optical methods. A number of films have music and effects as well as commentary, and it is very necessary to keep this part of the recording in all versions. When recording the original commentary on the English version and mixing the sound, a separate mix of music and





*In Ceylon, Shell films are given commentaries in two languages—Ceylonese and Tamil. Here is a magnetic-stripe recording session in progress*

effects only is carried out. When a company in another country wish to make their own version in another language, a duplicate print is sent to them, together with a music and effects track if required. A commentary in the required language is then recorded locally and mixed with the music and effects.

This procedure is only suitable for countries where adequate studios exist—for example, Norway, Sweden, France, Germany, Holland, Italy, Venezuela, etc. There are many countries without facilities for doing this work, or where the amount of use the film will get is too small to warrant the considerable cost of making an optical version.

### *Many Dialects*

There are also countries where so many dialects are spoken that the cost of producing a full optical version in each case would be quite uneconomical, although the total number of people to whom films can usefully be shown may be very large.

By means of striping, all films can be presented in the appropriate dialect—without which their value might be almost nil. Fortunately there are usually a few main dialects in each area which are widely understood. In Ceylon, for example, versions are made in Ceylonese and Tamil. In East Africa the most important dialects are Kikuyu and Swahili.

The Shell film unit urges upon other companies the importance of keeping

up professional standards by retaining the music and effect with any new commentary recorded, and also by translating the titles into the required language.

The film unit makes its originals on 35mm. stock in order to obtain the highest possible standard of quality, but copies for distribution are normally on 16mm. stock. If music and effects are required, these are put on the optical sound track, and the film is half-striped. The commentary is then recorded on the half-stripe; the volume of the sound is reduced slightly, but there is no loss of quality. The film is accompanied by a post-production script, which sets out not only the titles and commentary, but also the positions of the music and effects "keyed" from the beginning in terms of footage. This guide print enables the translator and mixer to assess the timing and lengths of commentary and to be sure that the translated paragraphs will fit.

### *Improved Quality*

If a film has no music and effects, it is provided with a full stripe, which gives improved quality in relation to volume.

In many films the educational and informative value is wholly or largely lost if the emphasis is misplaced or if the synchronisation is at fault. It is therefore considered essential that before attempting to record a translated commentary, the supervisor should study the original English

version and find out how the makers of the film intended the sound track to appear.

On the recommendation of the film unit, the recording—though supervised by the local Shell representative—is usually carried out by film technicians appointed for the purpose. It should take place, where possible, in a properly-equipped studio or at least in a room which provides suitable conditions. Ideally, the commentator should be in one room and the projector in another to keep the noise of the machine away from the microphone.

### *Mixed 'Tracks'*

There are at present only a few machines that will allow a modified commentary to be recorded magnetically on a film which already contains an optical track with the music and effects. For the past two years the Shell film unit has been investigating and testing the facilities offered by the various models available in order to make recommendations to Shell companies overseas who are interested in obtaining optical magnetic equipment.

At present, one of the limiting factors is the fact that magnetic-optical sound projectors are still comparatively scarce. It is understood, however, that in the near future machines will be available for copying purposes, together with relatively cheap "slave" projectors, designed purely for playing. Each company would require one recorder projector, plus a number of slave projectors for showing films.

The advantages of striping to Shell Petroleum can be summarised as follows:—

- 1—It allows translated commentaries to be recorded in countries with no studio facilities for optical recording.
- 2—Flexibility. Several versions can be made in the same country at reasonable cost. If a version is only required for a short time it can be wiped out and another commentary substituted.
- 3—Economy, which is important in some areas.

One disadvantage of magnetic sound is the possibility that a recording might be erased accidentally by a careless projectionist. It is desirable therefore to have a master from which an unlimited number of copies can be made. The Shell film unit always preserves its original negative and makes all prints from duplicates.



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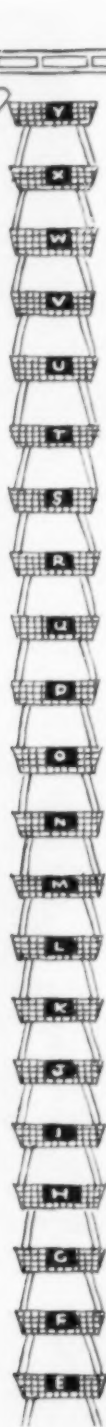
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# Here is an Alternative to Piecework

By IVOR B. COOKE

*Director and General Manager, Hopkinson Electric Co. Ltd.*

The author describes his practical experience, and the benefits obtained, from setting up a merit bonus system for labourers, crane-drivers and other general workers, later extending the scheme to include fitters and foremen.\*

ALTERNATIVES to piecework, having as their essential incentive based on individual performance, are far more common in this country than seems to be generally known; a number of large groups employ them in one form or another. The alternative to piecework which this paper describes was formulated early in 1950: like Topsy "it just grew" and within twelve months every hourly paid worker in the factory was on some form of bonus based on point rating; so was supervision.

It is still being operated and has also been instituted in a number of other factories in the area, although the individual applications have been varied to suit the circumstances. Flexibility is one of the attributes of the scheme.

The factory described here employed some 500 hourly-paid workers, and these were distributed amongst: two main erection shops; a fitting shop; a heavy machine shop; a light machine shop; a fabricating shop; and a pattern shop.

The factory was engaged on producing heavy engineering equipment. The majority of the heavier products

were "one off," although there were occasions when orders were received in the medium range for quantities up to ten. A very large proportion of the work was made straight off the drawing board, bearing only a slight resemblance to previous products. The nature of the work demanded a high degree of skill and practically all the direct workers received skilled rates. The majority of them merited it.

Really skilled labour was at a premium, for within easy travelling distance there was a number of concerns engaged in the aircraft industry.

The problem first arose of finding a method of remuneration which would enable the company to attract and then keep indirect workers in the labourer, crane-driver and slinger classes, and persuade them to perform their duties with a reasonable degree of activity.

At that stage these men were being paid a flat rate based on the National Agreement with, in certain cases, a few shillings merit bonus allotted on a distinctly arbitrary basis. By and large, they were receiving less than this type of labour could obtain in other employment in the district. The problem was not so much to increase the number of this class of worker as to improve the calibre of the intake and to stimulate the permanent residents into a greater measure of activity.

It was, therefore, decided to institute

a form of merit bonus based on point rating where the performance of the individual could be measured as accurately as possible under the most suitable headings, and the headings which were finally decided on were:

- 1—Sense of responsibility
- 2—Output, i.e. effective work performance
- 3—Initiative
- 4—Co-operation
- 5—General shop discipline

Each of these headings was given an equal loading of 20 points. A somewhat arbitrary scale of bonus was drawn up in the form of a graph relating these points to various sums of money, and the performance of each individual was considered by the foreman concerned under each of these headings, in the presence of the works manager and the personnel officer.

In order to obtain some standard of comparison, all of one particular class of labour was considered together by all the supervision involved, so that the merits of one could be compared with the merits of another.

This change of procedure was initiated and applied without very much difficulty, no doubt facilitated by the fact that the majority of the men received an increase in pay. It was made clear that re-assessment of performance would take place every three months, when any improvement or deterioration in performance could be taken into account and adjustments made to the existing merit bonus, where necessary.

It was also emphasized that this was a personal merit bonus based on personal performance and, whilst it was hoped that all adjustments would be upwards, reflecting improved efficiency, the converse could apply and a man could have his merit money reduced if he let his performance deteriorate under any of these five headings.

The undertaking was given, however, that any such reductions would be made only after the individual concerned had been given due warning, accompanied by a statement of his

\* This paper was presented to the Sixth Residential Summer School of the Institute of Cost and Works Accountants.

deficiencies, and reasonable time to correct them.

The scheme worked in so far that a better calibre of labour was attracted, the performance of the existing workers improved and, overall, it was found that the same work could be carried out better with a smaller number of indirect workers. By and large, an improvement took place under all the headings but most notably on the score of co-operation.

The scheme had only been running a few months before a storm blew up in the form of an application from the fitters for an increase in their compensatory bonus. At that time both the machine shops had been on straight piecework for many years, but the majority of the fitting shops were on a flat lieu bonus, known as a compensatory bonus, paid over and above their base rate and cost-of-living bonus.

Some time previously, in order to give the fitting shops additional incentive, an attempt had been made to introduce piecework, but there were very real difficulties in applying piecework in these shops due to the heavy and jobbing nature of the majority of the work.

### *Pronounced Gap*

At the time the compensatory bonus was initiated it no doubt bore some relation to the piecework earnings in the machine shop where the data upon which piecework times could be based was, ostensibly at least, more easy to establish. During the course of the years a very pronounced gap had arisen between the earnings of the machinists and the fitters, and as usual in a piecework application of this kind, the highest earnings were enjoyed by the men with the least skill employed on capstans where the batch quantities were not unreasonable and they could turn the work out.

Needless to say, this state of affairs was particularly galling to the really skilled men. While periodic attempts had been made to raise their compensatory bonus a few shillings at a time to keep the gap within reasonable limits, it had never been closed, so the attempt to introduce piecework was made.

It was decided at that time that it was only feasible to apply piecework to the sub-assemblies, as the difficulties attendant upon assessing the man-hour content of the jobs in the main erection shops were considered too great. Thus one had the condition whereby a man could spend part of his time on piecework and part on flat

compensatory bonus. This did not seem to work well, and when an analysis was made it was found that the average fitter was spending less than 20 per cent of his time on piecework. The request from the shop floor, then, was for an increase in the compensatory bonus accompanied by certain derogatory comments about the piecework system.

Again the problem was to find some means which would meet the legitimate claims of the fitting shops and yet ensure that any increase granted would be accompanied by at least a corresponding increase in activity, the level of which was not high. So it was decided to see what could be done by applying a merit bonus scheme based on somewhat similar lines to that operating successfully for the indirect workers—although obviously a somewhat different basis would have to be employed.

Obviously one of the most essential factors to encourage was a high standard of craftsmanship, as the nature of the product was such that one had to rely upon the sense of responsibility of the fitter to a very marked extent. Much of his work was subsequently hidden in the assembly process, and it was quite uneconomic to institute inspection at every stage. But bad workmanship would very soon make its presence felt in service.

Craftsmanship, therefore, was obviously the first heading to be considered. Output was of equal importance. Another factor to be considered was experience, as the range of products was extensive. A man who could be readily switched from one type of job to another, and who possessed both adaptability and initiative was worth his weight in gold.

### *Final Headings*

In the initial stages a number of subsidiary headings were considered, of which one was general shop discipline, but during the course of the preliminary negotiations with the unions these were jettisoned and the final scheme concentrated on:

- 1—Craftsmanship (40 points);
- 2—Output (40 points);
- 3—Scope and experience (20 points).

It was also apparent that an improvement in the method of assessment over that employed for the indirect workers must be introduced, in order to overcome probable misgivings on the shop floor. It was, therefore, decided that:

- a. Wherever possible there should be

two separate ratings carried out independently, firstly by the foreman and secondly, at a different time, by the chargehand.

- b. The ratings should be attended by a member of the shop floor.
- c. The ratings should be carried out in the presence of either the personnel officer or the works manager as chairman.
- d. Everyone had the right of appeal against the results of a rating.

Again a somewhat arbitrary graph was drawn relating the points to money. This took the form of a straight line up to about 60 points, thereafter curving upwards at an increasing angle so that, whereas a point between 50 and 60 was only worth about 1s., between 85 and 95 it was worth a lot more.

### *Trade Union "No"*

This scheme was put to the trade unions and turned down flat. However, eventually a works conference took place, and at the end of a somewhat tiring day the shop floor agreed to give the scheme a trial for a period of three months. So the first rating took place.

During the course of the negotiations it was apparent that, apart from the individual's instinctive dislike of anything new, there was a deep-rooted suspicion that the possible presence of those ubiquitous twins, "favouritism" and "victimization," was causing a lot of misgiving. It was felt that the best way of dispelling this suspicion was to make the scheme as widely understood as possible by the shop floor, so they were encouraged to send in to the ratings, as far as possible, a different representative for each heading.

The rating itself was carried out on a board which was divided vertically into five main sections, to correspond with the five main groupings on the rating sheets illustrated on page 119, and each vertical section was, in turn, sub-divided into eight rectangles, so that in all 40 such rectangles were on the board, each corresponding to one point.

To begin with, each fitting shop and the fabricating shop were dealt with separately, and the names and check numbers of all the men in a particular shop were put on small cards. The rating then took the form of arranging these cards in the appropriate rectangle bearing the number of points to be allotted to that individual.

Each heading was taken separately and, in order to give some guidance



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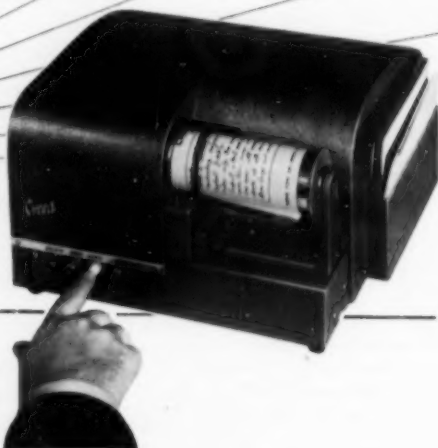
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during the rating, rating sheets were printed in large type and stuck on the wall, these sheets giving, firstly, the points to be considered under that particular heading and, secondly, some indication of the standard of performance to be expected within the five main groupings. Facsimiles of each sheet are reproduced in the text.

The procedure was for the foreman or chargehand to arrange each individual's cards on the board to line up with his assessment of their performance, and this was facilitated by the assessor being able to view his shop as a whole and also each man in relation to the other.

During this time the shop floor representative was there, but could make no comment. Once the assessor had finalized the rating, the shop floor representative was invited to make any comment or criticism he liked on the placing of the cards. The assessors were told that they should consider these comments carefully. They were not bound to reject them but, on the other hand, if they did they had to advance very tangible reasons why they did not agree with them. Similarly, the shop floor representative had to make an equally good case for any changes he suggested, and so a full and free discussion took place.

### Points Allotted

When agreement had been reached and the final position of the cards settled, the appropriate number of points was called off and entered on the man's rating card by either the works manager or the personnel officer. On this card, space was provided for recording both the foreman's and the chargehand's rating under each heading, and it also bore details of all previous ratings. At this stage it was not seen by the people carrying out the assessment. Any man could see his own card, however, after the rating had been carried out. The actual number of points allotted to a man was the mean of the total points emanating from the foreman's and chargehand's ratings.

The most striking thing which very rapidly became evident was the realistic, constructive and objective nature of the majority of the comments from the shop floor. Naturally, it took time for them to find their way about. In fact everybody was feeling his way, but the results exceeded all expectations. The initial ratings were, of course, rather lengthy, but subsequent ones came down in time quite appreciably, although they were never allowed

to be skipped.

After a foreman had worked through craftsmanship, he usually dealt with output, generally with a different shop floor representative, and then on to scope and experience. The chargehand then had his go, again with a different shop floor representative, and so the final rating was the pooled opinions of anything from four to eight individuals.

At the end of three months the scheme was accepted by the fitting shops. At the end of a further three months a fresh rating took place when adjustments were made for the varying standard of performance, and these ratings have been going on three times a year ever since.

After a few months the pattern shop applied to be put on a similar scheme, and after some twelve months it was applied to the machine shops.

It became evident at a very early stage that the quality of supervision was patchy. A number of the foremen and chargehands were relics of those desperate days during the war when skilled men were at a premium and anyone who had served his time tended to be promoted irrespective of his administrative abilities.

The ratings speedily showed up deficiencies, because it was obvious that the poorer foremen and chargehands had no idea about the individual performances of their men and had little or no defence against the well-marshalled arguments of the shop floor, whereas the better grades of supervision dealt with these arguments on their merits and either supported or rejected them on logical grounds. So it was decided to introduce a form of rating for supervision, and this time the headings were:

- 1—Powers of leadership (20 points).
- 2—Initiative and drive (20 points).
- 3—Knowledge of the job (20 points).
- 4—Administrative ability (10 points).
- 5—Commonsense (20 points).
- 6—Co-operation (10 points).
- 7—Discipline (10 points).

These ratings were carried out by the works manager, the assistant works manager and the personnel officer. The foremen were invited to send in a representative, but they did not avail themselves of the opportunity. The result of these ratings was quite a change round in the supervision.

As time went on the nature of the workers' ratings changed somewhat. Firstly, it was found far better to deal with all fitting shops together, in order to preserve some uniformity in the

## Points to Consider

### CRAFTSMANSHIP

MAX. RATING  
40 POINTS

#### Consider

- 1—The ability of man to turn out any job coming within his trade to the required standards of accuracy and finish.
- 2—The amount of supervision necessary to ensure he does this.
- 3—Whether he produces a good job for the job's sake.
- 4—Whether a replacement of similar calibre could easily be obtained or not.
- 5—His sense of responsibility to his work and the equipment he uses.

### OUTPUT

40 POINTS

#### Consider

- 1—The rate at which a man turns out effective work. Whether he is constitutionally slow or slow because he takes pains or slow due to incompetence.
- 2—The amount of supervision necessary to keep him working.
- 3—Whether a replacement of a similar calibre could be obtained or not.
- 4—Whether he wastes his own and other people's time by gossiping and loafing about.
- 5—His ability to concentrate.

### SCOPE AND EXPERIENCE

20 POINTS

#### Consider

- 1—The different types of plant with which a man is familiar and competent to deal.
- 2—Is he capable of erecting plant in the field either alone or under supervision and has he the confidence to apply this capability.
- 3—Whether a replacement of similar calibre could easily be obtained or not.
- 4—His adaptability and initiative, i.e. does he learn easily and use his commonsense in overcoming obstacles or is he continually running to supervision for assistance on even the most minor problems.
- 5—Is he willing to use his experience to assist the Company.

### SCOPE AND EXPERIENCE (Machinists)

#### Consider

- 1—The different types of machines with which the man has had experience or would be competent to handle.
- 2—Whether a replacement of similar calibre could easily be obtained or not.
- 3—His adaptability and initiative, i.e. does he learn easily and use his commonsense in overcoming obstacles or is he constantly running to supervision for assistance on even the most minor problems.
- 4—Is he willing to use his experience to assist the Company.

rating and overcome the tendency of some supervisors to over-rate and others to under-rate. This also broadened the value of the assessments, as fitters were frequently transferred from one shop to another, according to the loading on the shop. Under these circumstances as many as 70 would be rated at one time.

It was also found better to deal with small groups of men, such as maintenance men, by a committee which consisted of the maintenance engineer, the foremen of the shops the maintenance people served, the assistant works manager and one of the maintenance fitters. The inspection department was dealt with on somewhat similar lines.

### Financial Reward

It had been made abundantly clear by the management at the inception that, as in the case of indirect workers, the financial reward would be strictly related to the performance of the individual—if performance improved there would be an increase, if it deteriorated there would be a decrease after due warning.

During the course of about three years some 40 warnings were given, and the individuals concerned were given until the next rating to improve their shortcomings. In the vast majority of cases, this had the desired effect. It was found necessary to reduce the earnings of about a dozen of these people: two or three left, but the majority of the others pulled themselves together, and many subsequently worked up to a level of earnings above that which they previously received.

Appeals against ratings were comparatively few, but where they were made through the shop stewards and the foremen they were dealt with very fully; all the parties to the original rating were brought in, including the man's shop steward, and his case was heard.

Usually the appeal was in respect of one particular heading, such as craftsmanship, and other parties were then brought in, such as the appropriate members of the inspection department who were familiar with the man's work, in order that their views might be heard. The proportions of the appeals allowed and disallowed were, speaking from memory, approximately equal.

It was found that the best method of dealing with a man who came in with a somewhat confused idea that he was worth more points but did not really know why, was to let him rate himself

under each heading and then tell him what he had been allotted. Invariably these individuals allotted themselves a lower rating than they had been actually given.

As the scheme progressed a very high degree of confidence was built up between the shop floor and all groups of supervisors, and the ratings became, in the majority of cases, a thorough exchange of factual information about the relative merits of each man by the people who knew most about his actual performance—his supervisors and the men who worked alongside him. They really became a form of joint consultation in its truest sense, and had the effect of improving the status of the supervisors in the eyes of the shop floor and giving back to them a degree of control which the creation of functional departments had tended to whittle away over the years.

A man realized that his performance was being watched by his supervisor, and he was aware that if he improved his performance under any heading, then such improvement would directly affect his pay packet. He also knew,

#### EFFECTS OF MERIT BONUS SYSTEMS

- 1—Improved Status of Foremen
- 2—Better Industrial Relations
- 3—Continual Incentive to Improve Performance

from practical demonstration, that any deterioration of performance would adversely affect his money.

These two factors provided a continual incentive to maintain and, if possible, improve upon his performance—which is so notably lacking under a piecework system. Furthermore, his weekly pay packet was dependent upon the hours he worked and not upon the ingenuity he employed in arranging his tickets.

Good supervision was, of course, essential, and it was perhaps not a bad thing that a man on the shop floor knew that the performance of the supervisors themselves was constantly being assessed by higher management.

The whole machinery of assessing the man-hour content of the job was retained and in fact improved, because the ratefixing department was absorbed into the process layout section and the total staff of the combined sections reduced, as it was no longer necessary for the men to spend considerable time on the shop floor over petty wranglings as to whether or not an individual time was adequate.

### Job Tickets

Job tickets continued to go out with the operation time on them and a record was maintained of each man's performance by comparing weekly the operation time with the actual time taken; thus, over the weeks, a trend was revealed which was used as a guide when output was being rated.

Similarly, scrap and rejection notes were also recorded against the individual so that these would give one indication of the standard of craftsmanship.

In the end the work content of all jobs carried out in the erecting shop was assessed, and these times were given to the foreman, broken down into sub-assemblies, and it was his responsibility to see that the job was performed within that time. Where this did not occur, an enquiry took place and the foreman had to produce very solid reasons as to why the time had been exceeded, or be able to prove that the time originally allowed was inadequate.

As wage rates remained constant for stretches of four months at a time, wage calculations were simplified enormously.

The scheme would undoubtedly have been improved had it been possible to introduce some form of job differential, but this was not found to be practical, chiefly because the unions were quite unable to agree amongst themselves on any basis for this—a patternmaker feeling that he was a better craftsman than a fitter, and vice versa.

With a factory engaged on this kind of production it is extremely difficult to measure output on other than a somewhat arbitrary basis, but undoubtedly there was an improvement in output, and also in workmanship. Industrial relations improved very greatly and joint consultation actually took place at the lower levels, and was not confined to the somewhat formal proceedings of a committee. Thus confidence was increased all round. The scheme is still working to the satisfaction of all parties.



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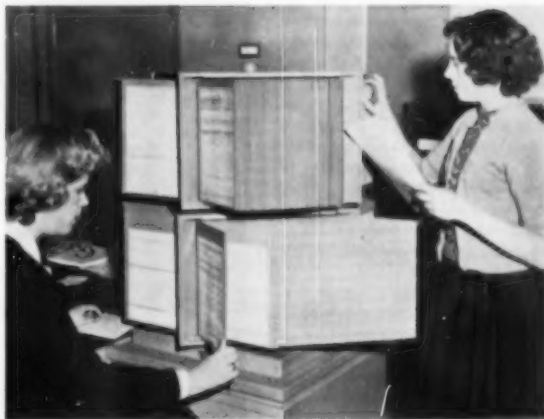
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## Making the Most of Office Equipment—3

Of the systems described in this article, No. 1 is designed for the firm requiring quick-reference records, No. 2 for the firm requiring selected information, and No. 3 for the firm requiring long-term records which take up a minimum of space.



*Quick-reference details of 150,000 customers are kept on three of these rotating strip-index units in the Colgate-Palmolive records department*

# Three Ways of Keeping Compact Records

- ★ **STRIP INDEXING**
- ★ **HAND NEEDLING**
- ★ **MICROFILMING**

### Strip Indexing

#### The System

Strip indexing equipment is designed primarily for firms who require a quick reference to lists of detailed information. All items of information are typed on individual strips which are then set up in hinged panels. The panels are held in a variety of units which cater for indexes of all sizes.

In the application described below the largest units are used—double-tiered models each holding 400 panels and with a capacity of 56,000 items of information. The models revolve and operate within a diameter of only 43 inches, and because of their four-sided construction, provide access to more than one person at a time.

The equipment is adaptable to almost any indexing requirement; for

example, lists of telephone numbers, follow-up records, factory progress records, and personnel records. It is also extremely flexible in use, since changing information can be speedily inserted anywhere in the panels simply by making out a new strip and slipping it into the required position. The strips themselves are supplied linked together on a thin paper background so that they can be more easily inserted into a typewriter.

#### Case-history

Improved efficiency and appreciable

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**By ARTHUR PARNETT**

---

savings in time and labour have resulted since three double-tiered strip index units were introduced last year to the records department of Colgate-Palmolive Ltd., London, W.C.2. The company are using the system to compile a comprehensive list of nearly 150,000 customers throughout the United Kingdom.

Each customer is represented in the index by a strip containing essential

information about his individual characteristics. On each is typed the customer's name and address, a number representing the district, a number signifying the salesman responsible for that territory, an account number, a number representing the customer's classification (for instance, grocer or chemist), a number denoting the market research area and a purchase tax code number. At the end of the strip are two columns which indicate discount and terms.

Colour plays an important part in the index. Where the customer has a straightforward account—usually the smaller firms where goods, invoices and accounts are sent to the one address—he is represented by a white strip. In the case of a firm which has several branches, pink and buff-coloured strips are used, the former for the head office (where the invoices are sent) and the latter for the branch where the goods are delivered. Under this system, a chain of stores would appear in the index with a pink strip for the head office and a number of buff strips arranged alphabetically beneath, representing the various branches.

The system works similarly for customers who are members of buying associations, and who by this means get special terms. These customers

appear on a buff strip, and immediately below—on a pink strip—is the name of their association, together with all the relevant information which applies to its members. In this case, the goods are sent to the individual customer, and the invoice to the association.

The customer index is extremely valuable in helping to deal with orders quickly and efficiently. When an order comes in from a customer, it is made out on a special form. This form is forwarded to the customer index staff who then find the customer's position in the alphabetically-arranged index.

On the order form they fill in all the information about the customer which the order department needs to know—the district salesman who will be credited with the order, the account number, the customer's purchase tax classification and the terms he should receive. The completed order form is then passed on to be dealt with by the order department.

## Hand Needling

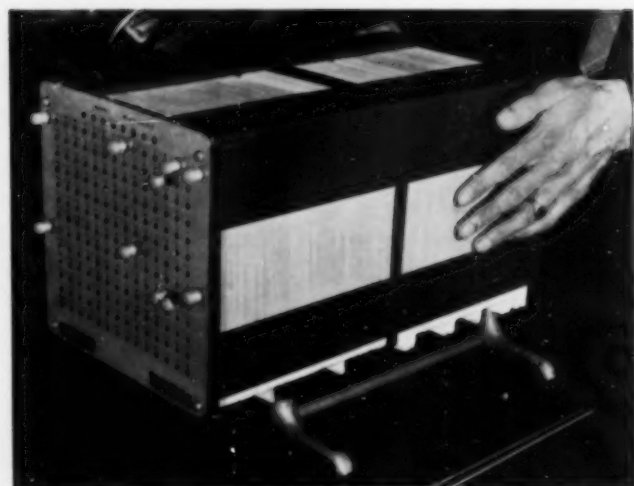
### The System

For firms who require a system which combines records with an automatic method of selecting facts by cross classification, the hand-operated punched card system (average cost £200 for 3,000 cards and equipment) offers great possibilities.

The equipment required consists of a sorting unit mounted on a cradle (complete with selecting rods), perforated cards measuring 8 by 8 in. or 8 by 6 in., a slotting punch and storage cabinets.

The system is built round the specially perforated cards. The top of the cards can be printed to carry either a brief summary of the record they index or can be extended to carry out the record itself. Thus they serve the dual purpose of record and index. Perforations in the body of the cards provide a means of indexing and selecting. The positions are numbered, and to each position is assigned a division of the pre-arranged classification scheme. Each card is prepared for mechanical selection by converting two of the perforations into a slot by means of the slotting punch.

When information by selection is required, the cards are taken from their cabinets and placed in the selector—800 cards at a time. Rods are pushed through holes in the front of the selector corresponding with holes on the cards. The selector is then inverted on its cradle, and those cards which



*The hand needling system, as used by E.M.I. Engineering Development. Illustrated above is the actual selecting process. The selector has been inverted on its cradle and is being gently shaken to hasten the dropping of the cards*

have been pre-slotted to answer to the classifications required will drop about half an inch. Another rod is then inserted to lock the cards which have dropped, the sorter is reversed and every card required is offset for reference. The number of classifications which can be selected in one operation is only limited by the number of rods in use.

### Case-history

For the past twelve months, the punched-card system has been used for maintenance of 3,000 staff records by the personnel department of E.M.I. Engineering Development Ltd., the design and development company of Electric and Musical Industries Ltd., at Hayes, Middlesex. Though other punched card systems are used elsewhere in the Group this system is regarded as the most suitable for personnel work, due to the written and punched information contained on the one card.

As soon as a new employee is taken on the payroll, his original application form and other relevant details are forwarded to the department for the transfer of information on to a card. Although quite a large part of the card is taken up with the selection portion which caters for over 200 different facts, there is still ample space for written details. Among the many facts recorded, mechanical classification can be utilized on birth dates, engagement dates, salaries, contracts, qualifications, trades, etc.

To give an example of how the

system works let us take a typical question that the department might be required to answer. "How many engineers earning £1,000 per annum or over, with honours in B.Sc. Physics, are working at Hayes?"

Firstly, cards are placed in the sorter 800 at a time and the rods are run through the cards as follows: Position 10 for Hayes, Position 61 for Engineers, Position 42 for Qualified, Position 22 for Honours, Position 24 for Physics and Position 60 for £1,000 or more.

The selector is then inverted so that the cards bearing the required facts drop down. This particular operation for 3,000 employees can be completed in about five minutes.

The personnel department are well satisfied that the system provides the best solution to their problems and requirements. Before the system was introduced it often meant hours of patient searching through several thousand pages of personnel record books before statistical answers could be produced. Now, of course, this work is completed in a matter of minutes.

## Microfilming

### The System

Although microfilming is neither the cheapest—about £400, usually—nor the quickest of reference methods (particularly where constant reference to data is required), it is often a well worth while investment for firms who



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*In the microfilm department at Telesurance. The top of the machine has been deliberately left open to show the interior of the projection unit*

are seeking an efficient method of maintaining long-term records conveniently and in the minimum amount of space.

The extent of the saving in space is certainly quite enormous. On a 100ft. length of 35 mm. film, for example, 800 full-frame—or 1,600 half-frame—photographs can be recorded, while on 16 mm., the number rises to 4,000 on full-frame or 8,000 on half-frame.

The equipment required, although relatively expensive, need not take up much room, nor is it difficult to handle. The camera and "reader" (for projecting the film on a screen) can be supplied separately, or together in one unit. One of the most popular types is a table model, which will photograph loose-leaf documents up to 14in. by 12in. at a rate of 1,000 to 1,500 an hour.

The more difficult process of developing the film is usually handled by the equipment manufacturers, who make a small charge—about two shillings a film—for this service.

#### **Case-history**

With the huge growth in popularity of television, the work of Telesurance Ltd., TV insurance specialists, has increased by leaps and bounds over the past few years—so much so, in fact, that at one time the filing of documents (particularly claim forms) had become a considerable problem. The best solution was found to be a desk-model camera-projector unit.

Under the system previously used, the dealer responsible for maintenance

of the receiver sent in a claim form to Telesurance. After this had been O.K.'d, a credit slip, repeating many of the details shown on the claim form, was typed out and mailed to the dealer, while the claim form was forwarded to the filing department.

Now, when a claim form is received, it is first O.K.'d, is then stamped with an identification number, microfilmed and returned to the dealer. In the event of a query being raised, the firm have only to ask for the identification number and then run off the appropriate film. As the documents are filmed in strict numerical order, it is a matter of seconds to locate the right copy. To simplify matters, the identification number is changed on the first day of each month—100000 for January, 200000 for February, 300000 for March, and so on.

Altogether, three major savings have been achieved:

- 1—*Space.* As all claim forms are now returned to the dealer, the saving has been enormous. About 150,000 forms have so far been microfilmed, and these films take up an area of less than 2 sq. ft.
- 2—*Labour.* The number of staff concerned has remained static, although the amount of work has increased threefold.
- 3—*Time.* Experience has shown that it is usually quicker to run off a film than search through ordinary cabinet files.

Telesurance have found that the

average speed of filming is about one form per second. Operation is quite simple, consisting—in the filming process—of placing the form in the photographing position and pressing a switch. To operate the projection unit, the spool of film is loaded into the machine and run through by turning a handle at the side. The picture is projected on to a small white screen in the base of the unit.

Telesurance have their films developed once a week. This is done by sealing up the spool in a small box provided by the manufacturers and addressed to the processing department. In a few days, it is returned and can then be placed in a cardboard container, with the first and last identification numbers clearly marked on the outside.

## **WHERE YOU CAN GET THESE SYSTEMS**

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**BULMER'S (CALCULATORS) Ltd.,** Empire House, St. Martin's-le-Grand, London, E.C.1

**CARTER-PARRATT Ltd.,** Idlesleigh House, Caxton Street, London, S.W.1

**C. W. CAVE & Co. Ltd.,** 59 Holborn Viaduct, London, E.C.1

**COPELAND-CHATTERSON Co. Ltd.,** Exchange House, Old Change, London, E.C.4

**COPYCAT ASSOCIATED (MARKETING) Ltd.,** 11 Southampton Row, London, W.C.1

**KALAMAZOO Ltd.,** Northfield, Birmingham, 31

**MOORE'S MODERN METHODS Ltd.,** 19-21 Farringdon St., London, E.C.4

**REMINGTON RAND Ltd.,** 1-19 New Oxford St., London, W.C.1

**RONEO Ltd.,** 17 Southampton Row, London, W.C.1

**SHANNON Ltd.,** Shannon Corner, New Malden, Surrey

### **Hand Needling**

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**COPELAND-CHATTERSON Co. Ltd.,** Exchange House, Old Change, London, E.C.4

### **Microfilming**

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**KODAK Ltd.,** 1-2 Beech St., London, E.C.1

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*Each card is slotted to indicate a particular entry in the balance sheet, trading account or profit and loss section; after slotting, it is inserted into an adding and listing machine, which prints the amount*

# Punched Card Accounting— By Hand

By ALAN WHITEHEAD

**W**HEN a firm have more than 150 trading units, various sources of supply, and deal in more than 6,000 lines, accounting and expenditure analysis obviously presents many problems. However, The United Yeast Co. Ltd., Manchester, have so streamlined their accounting procedure that they are able to produce—without difficulty—twice-yearly detailed trading and profit and loss accounts for every branch or trading unit. Furthermore, they have done this without engaging extra staff or increasing the burden of work on existing staff; in fact, the opposite is the case, for with their new system senior employees have been freed for other duties.

In centralizing the nominal ledger accounting (as distinct from debtors accounting) at head office, they have

also achieved standardization. They have done this by the adoption of a system of hand-operated punched cards, used in conjunction with adding and listing machines. This has enabled them to dispense altogether with nominal ledgers and to produce final accounts at balancing dates from the punched cards themselves.

The company are engaged in the sale and distribution of yeast and bakers' sundries, the latter consisting mainly of fats, sugar, fruit, egg, essences and almond products, salt and aerating agents, together with cake ornaments and bakery equipment. The bulk of the yeast and a smaller proportion of the sundries are produced at factories of The Distillers Co. Ltd. group, the remainder being purchased from outside suppliers.

Their distribution and service organ-

The half-yearly management accounts produced by the United Yeast Co. Ltd. give detailed trading and expenditure information about 150 separate branches, located in various parts of Britain. The company are able to do this by using hand-operated punched cards, and the system has also enabled the company to centralize and standardize their nominal accounting at their head office. A different application of hand-operated punched cards—for staff records—is described on page 124.

ization is controlled by seven centres arranged on a geographical basis. Each centre is responsible for a number of branch trading units.

Previously, the centres kept the whole of the books for their own areas, covering both the nominal or private accounts and the customers' accounts; the latter, in fact, are still retained at centre offices. Trading and profit and loss accounts, in an abbreviated form, were compiled at each centre and forwarded to the head office for consolidation.

When, about two and a half years ago, the company decided to achieve closer control by centralizing their nominal accounting, a hand-operated punched card system was chosen in place of the usual hand-written ledgers in order to provide the detailed trading and analysed expenditure figures required for the large number of branches. An essential feature was the introduction of specially designed documents by means of which the original financial information concerning purchases, sales, expenditure, etc., is supplied by the centres to head office, where it is accumulated on cards, eventually to be produced in the form of management accounts.

In addition to the benefits of standardization and the elimination of a great deal of figure-work at the centres, the new system has several other advantages:

1—Information is produced more efficiently and cheaply, yet in greater



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# AGAVOX

NOVEMBER, 1955



*A method of "needle-sorting" is used to group completed cards under individual headings within the trading and expenditure sections*

detail, than would be possible at centre level.

- 2—Final accounts are prepared for individual centres with a shorter time lag between the final entries being made and the accounts completed.
- 3—Dual-purpose forms devised for the new system have reduced the work at centres. The whole of the purchases are now dealt with on a cash basis, creditors' ledgers have been abolished, and the purchase journal and requisition form (cheques being requisitioned from head office for all such payments) are combined in one document.
- 4—The consolidation at head office of requisitions from different centres, for payments to merchants supplying all centres, has reduced the number of cheques forwarded by the company each month.
- 5—As the new methods run on pre-determined lines, female workers and relatively inexperienced clerks can be employed, thereby relieving senior staff for responsible work at both centre and head office levels.

The format of the punched cards was designed jointly by the company's accountant, T. Tiplady, and a Manchester representative of the firm who supply this equipment. The card is manufactured with holes around its edges, sections of which are devoted to essential information relating to the figure printed on the card by an adding and listing machine, and the nature of the entry is indicated by slotting out the relevant punched holes. Each card, slotted and printed, constitutes a single posting which would normally be contained in a ledger account.

centre and branches, and have been so designed that the cards protrude slightly at an upward angle, enabling them to be quickly extracted.

The various accounting entries are originated in the documents prepared at centres. As these are received at head office they are coded by two senior male members of the staff.

Cards are then slotted (i.e., the holes are clipped out) by a hand-operated multiple key punch, to indicate the particular entry in the balance sheet, trading account, or profit and loss section, which have abbreviated references against allocated holes. The trading section summarizes the numerous lines under four main headings: Sundries, ornaments, bakery equipment and yeast ("S," "O," "B," and "Y") and indicates whether the posting is of a sale, a purchase, an item supplied to a branch, or a product sold to a group company. The profit and loss section consists of 27 categories of expense.

The slotted card is immediately inserted into an adding and listing machine with a tally roll attachment, which prints the relevant amount on to the card and simultaneously records the figure on the tally roll. The debit or credit of the entry is stated on the card and on the tally roll. By comparing the totals shown on the latter with the totals of the particular document after completing the postings, the operator can verify (a) the arith-

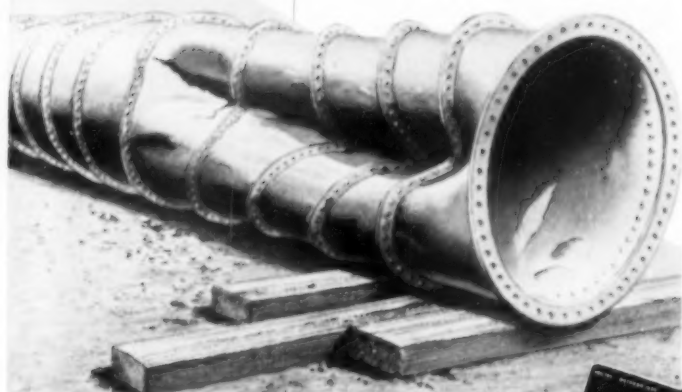
One section of the card contains holes coded by letters, which represent the seven centres (Birmingham, Bristol, Leeds, London, Manchester, Newcastle and Glasgow) and by numbers, which represent the branches. The coding arrangement on the card allows for any number up to 69 to be slotted for each centre area, which is more than adequate.

The appropriate holes in the card are pre-slotted by means of a gang punch to indicate the relevant centre or branch, and are stored in cabinets to await postings. These cabinets contain pigeon-holes representing



*Final accounts at balancing dates are produced from the punched cards themselves. Accounts figures show the net profit of each individual trading unit*

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metrical accuracy of her postings, and (b) the original additions in the document. No handwriting appears on any card.

There are two girls engaged on this operation, one of them slotting and listing simultaneously and the other checking. To provide some variety in their work they exchange jobs every day. It is possible for just under 500 postings to be made in an hour, although this is a maximum speed and cannot be maintained for long periods.

In the final stage in the slotting process, the card is "gang slotted" to record the month and, where necessary, the week of the entry, and also to indicate the document from which the posting originates—journal sheet, group clearance form, sales analysis, purchase and expenditure requisitions, head office payments advice or weekly cash sheets from centres and branches.

The documents are returned to the centres where they are filed in suitable binders. Simple charts are kept at head office to record the receipt, posting and return of documents. They are composed of rectangles for each centre, for each document, and for each month, these being shaded with coloured pencils to indicate the completion of the various duties.

Completed cards are sorted under individual headings within the trading and expenditure sections by a simple and speedy method of "needle-sorting." A batch of cards is aligned, and the needle is passed through the hole representing the particular heading required; where this hole has already been slotted out, the relevant cards are separated from those retained on the needle. The sorted cards are filed in trays, and every month are summarized under individual headings on blue cards (the originals are buff) slotted to correspond with the originals. The blue cards are then filed under document headings, to be available for the settlement of document queries which occasionally arise.

### *Interim Totals*

At the end of each period of three months, the blue cards are needle-sorted under trading unit headings and, in turn, are summarized on red cards, from which management accounts are produced at the half-year and year-end in September and March respectively. Interim totals of trading unit sales are produced at June and December for the use of management at centres and to reduce the quantity

of work at balancing dates.

The trays are kept in two cabinets which together hold 100,000 cards. The buff and blue cards which have been summarized are in due course extracted from the trays and retained for record and audit purposes. About 230,000 cards are used annually.

Management accounts consist of a printed trading and profit and loss account for each centre and branch, in which the figures are typed directly from the red cards, revealing the net profit of each individual trading unit. An unusual feature of these accounts is the detailed trading and expenditure information provided for over 150 separate branches.

Two men and two girls undertake the work of coding, slotting, sorting and adding the cards, but they are not employed solely on these operations; it is estimated that, statistically, one and a half men and one and a half girls are employed full-time. During non-balancing periods there is a steady flow of work which the staff can easily deal with, although a certain amount of overtime is necessary at balancing dates. Neither of the two girls had any previous book-keeping experience, and went straight on to the job without special training.

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NOVEMBER, 1955

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Hallo—Brown and Sons?

Yes, can I help you?

I'd like to speak to the person dealing with export sales, please.

Hold the line a minute, please. . . .

Hallo, are you there? I'm putting you through to Mr. Green. . . .

Hallo—Mr. Green. . . .?

I'm sorry, Mr. Green's out of the office. This is his secretary. Can I help you?

Well, I wanted to speak to someone about export sales, and—

I'm sorry, you're through to the wrong extension. This is the service department. If you'll hold the line a minute I'll have you transferred. . . .

There cannot be a businessman alive today who has not taken part in dozens of just such irritating and time-wasting conversations. It happens every day and all day, in large firms as well as in small. It might even happen in yours. Have you ever taken

the simple precaution of ringing your business number from outside, and asking for yourself?

The fact is that, though most operators are fully trained in the rudiments of switchboard control when they join a firm, they are often deplorably lacking in the more social aspects of their job. Added to which, of course, there are those girls who gradually lapse, through lack of interest, into a couldn't-care-less attitude, and whose performances as a result do more harm to their employer's reputation than almost anyone else on the staff. It is amazing how many firms make no effort to ensure that their operators know at least the basic rules of tact and good manners.

Let us take the conversation shown above line by line. There are at least six bad mistakes, all of which are constantly cropping up:

**Line 1.** Although *Hallo* is the classic example of how *not* to answer a call, it is surprising how frequently it is still used. The correct approach is to be

polite, but without gushing—*Brown and Sons. Good morning.*

**Line 3.** *Can I help you?* is an irritating remark as well as being superfluous—if the call is correctly answered in the first place.

**Line 7.** *Are you there?*—again, quite superfluous.

**Line 8.** Here, the opposite is the case—too little information is given. Who is Mr. Green?—the managing director, a clerk, or the office boy? Correct answer: *I'm putting you through to Mr. Green, our export sales director.*

**Line 10.** Another frequent error. Efficient operators *always* check that the person concerned is in his office before transferring a call.

**Line 15.** The worst fault of all. There is nothing more exasperating than to be switched from department to department, explaining to each in turn the nature of your call. In the case of large organizations, admittedly, it is not always easy to avoid confusion, but every effort should be made to provide switchboard operators with a full list of departments, together with the names of the chief officials in each, and a brief but clear description of what their jobs entail.



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said the busy man*

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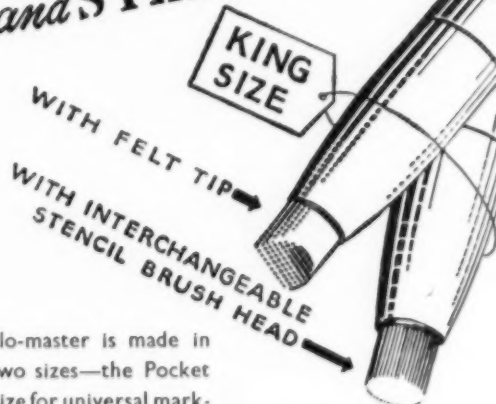
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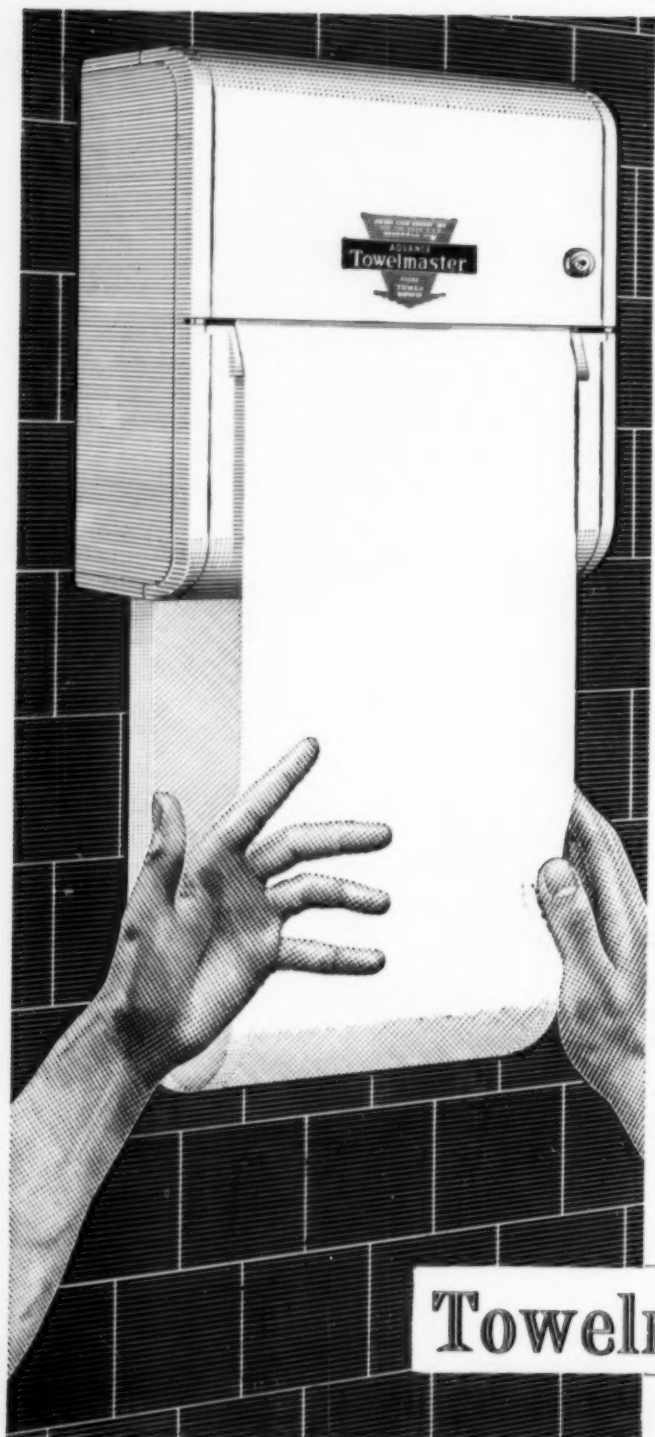
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*The safety officer, with the aid of a "robot man," shows apprentices how the spine can be injured through incorrect lifting*



## Accident Prevention is Everybody's Job

By JOHN A. ASH

**O**UR AIM is to make every one of our 1,750 workers virtually a safety officer." With these words, the safety officer of the National Smelting Company Ltd., Avonmouth, puts the company's accident prevention scheme in a nutshell.

When the company appointed a full-time safety officer in 1946, they decided that he should be regarded, not as a man who was expected to work miracles on his own account or "carry the can" for other peoples' carelessness, but as the co-ordinating influence of an organization which would eventually embrace all their employees. This policy is applied in many ways.

Safety plays a particularly prominent role in the induction training which every recruit receives before he takes up his normal duties. It appears as a regular item on the agenda at meetings of the production committees in joint consultation and works council and of the company's central council. It is one of the most important subjects in safety courses for foremen, prospective foremen and shop stewards.

Throughout the works, moreover, a number of trained volunteers are continually on the look-out for potential hazards and unsafe practices. This idea, perhaps more than anything else, brings the man on the shop floor into direct contact in playing an active part in accident prevention.

The hazards at Avonmouth are mostly connected with the handling of molten zinc and other metals, and of such highly corrosive materials as sulphuric acid and fluorides. Plain lack of care is responsible, the company have found, for most of the accidents which do occur; their ex-

perience places the percentage as high as 80. In 1946 the accident frequency rate (number of lost time accidents per hundred thousand working man hours) was 4.77. This figure to date has improved to 2.43 for the past twelve months. The number of lost time accidents in 1946 was 154, but was reduced to 115 in 1954. Although these figures reveal a substantial improvement over the years, they give no cause for complacency.

The management at Avonmouth look at safety statistics from an entirely practical point of view. They are not interested in getting a low frequency rate on paper. Through the teaching of their safety officer, they encourage workers to report to the medical centre for the slightest cut or abrasion. Looking at it in one light, the higher the treatment figures soar, the better they like it.

For this reason, there are no inter-departmental competitions for the lowest number of accidents. The

While the management at The National Smelting Co. Ltd., Avonmouth, employ a full-time safety officer to help and advise on the prevention of accidents, they feel that all employees should play an active part in their accident prevention scheme. Safety is a prominent subject in the company's training programme, and all departments provide volunteer "safety watchers."

management believe that such competitions may encourage workers who injure themselves slightly to think it is "just a scratch" and not bother to report it. The danger, of course, is that if the injury becomes infected it may mean several trips to the medical centre, or actual absence from work, whereas prompt attention would prevent any telling effect on production.

If the company encourages more accidents to be reported and treated, how have they lowered their frequency rate? The answer lies in their safety policy, and in the steps which they take to administer it.

Accident prevention starts when a man applies for a job. Not until he is thoroughly examined medically and given stringent tests on his physical faculties and reflexes, are his qualifications considered. The details of this examination, made by the works doctor, are passed to the labour officer who fills in an assessment card. Knowing the requirements of the



various jobs on the plant, the labour officer can place a man in a job most suited to his physical capabilities. A man who is unsuited to a job can be a menace both to himself and his fellow workers.

Having been engaged, an employee is given a one-week induction course. A large part of this course is devoted to safety and accident prevention, and much use is made of visual aids. The safety officer has found that a series of illustrations showing how to and how not to go about jobs promotes long (and sometimes heated) discussions amongst the class. He feels that if they are allowed to thrash out a problem this way, in two hours more can be taught than in a whole series of unillustrated lectures.

Incorrect lifting accounts for many accidents in industry. At Avonmouth, an ingenious "robot man" is used to show the correct way to lift. By means of a segmented "back-bone" it also shows what happens when a worker lifts incorrectly. After the course, each man is given a small booklet which gives a broad outline of the hazards likely to be encountered in the works.

Refresher courses for foremen, shop stewards and prospective foremen are

run continually, and include several lessons in safety. Members are selected on a rota basis. An interesting feature of these courses, is the "play acting." The training officer (a past safety officer at Avonmouth) and the present safety officer play the roles of an awkward employee and his supervisor. The awkward employee may be, for example, a careless man who does not wear his protective clothing. Cross-talk between the two officers often makes the members of the course "see their own reflections" and, once again, free discussion ensues.

### Safety Watchers

Each department in the works has its own "safety watcher." Each volunteer holds his office for a month, after which another takes his place. The "watchers" are expected to draw supervisors' attention to hazards, and to draw their fellow-workers' attention to unsafe practices. A comprehensive briefing, given to each new group of safety watchers explains the company's safety policy, the use of personal protective devices, a brief insight into the requirements of the Factories Acts, and tells the men what is expected of them.

The idea behind this scheme is that even when a man has completed his month of office, he continues to act as a watcher. In this way, a safety-conscious attitude is being inculcated systematically in all workers.

RoSPA posters—changed monthly—and road signs continually remind employees of the hazards which exist in the works. Accident statistics and graphs are posted on a board in each department.

Accidents however, still occur. They are not hushed up or pushed into the background. Every accident is thoroughly discussed at the company's 13 departmental production committees, which meet monthly. A report is provided by the safety officer, and the committee or committees concerned are invited to place the cause of each accident into one of three main categories. As all members of these production committees have been elected by their fellow workers, it is, in effect, the workers themselves who are taking an active part in accident prevention.

The categories are:—

#### A. Design, construction and operation

This covers faulty design and layout, faulty instruction and installation, inefficient light or ventilation, mechanical failure, inadequate guarding,



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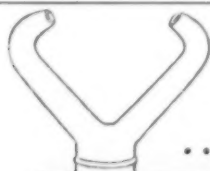
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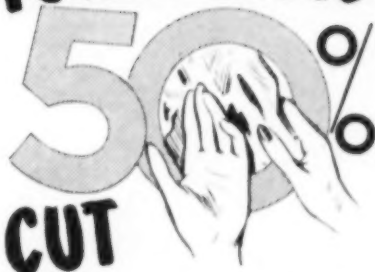
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faulty design of protective clothing, etc.

#### B. Supervision and training

This covers failure to see that suitable protective equipment is provided, untidy conditions, inadequate supervision or training, lack of rules and instructions etc.

#### C. Personal

This, the Safety Officer's greatest bugbear, covers failure to use protective equipment correctly, breaches of instruction or rules, unsafe practices, and a thousand and one things accounted for by the term "human element."

It has been found that 80 per cent of all accidents involving lost time are placed in the "C" category. All employees who lose time through accidents are interviewed by their superintendent together with the safety officer. The accident is discussed on a practical basis, with a view to future prevention, and usually both the worker and the company benefit.

There are certain classes of accidents which are the subject of a special committee of enquiry, made up of the deputy works manager, the superintendent of an independent plant, a representative of the workers, and the

safety officer. These are—

- 1—Accidents involving machines.
- 2—Gassing accidents.
- 3—Explosions.
- 4—Accidents reportable to H.M. Inspector of Factories.
- 5—Accidents involving failure of any lifting tackle, hoists, lifts, cranes etc.
- 6—All accidents of a serious nature.

The terms of reference of the committee are clearly defined: (1) to decide what caused the accident; (2) to make recommendations to prevent recurrences. The committee (or anyone else, for that matter) is not responsible for fixing the blame.

### Manager's Decisions

A report of the committee's findings is sent to the general manager, who issues a "decision sheet." These decisions become works regulations in any part of the group (The Avonmouth works is a member of the Imperial Smelting corporation) where they are applicable.

The company have their own protective clothing scheme, the clothing being provided free on a replacement basis. They also undertake to provide clothing other than that stipulated by

legislation, such as clogs for work in hot temperatures, rubber boots for wet jobs and overalls for the various classes of work performed. Protective safety-type footwear is also supplied free.

Accidents are often caused by untidy works or dirty machinery, and for this reason all departments participate in a "better housekeeping" competition. This runs for six months at a time. Members of a judging panel visit the plants in turn, inviting the superintendent to accompany them. Points are allocated on a percentage system, deductions being made for untidiness and dirtiness etc. The winning department is awarded a shield which is held for six months; an added reward is a visit (usually of educational value) to another organization.

Although the safety officer at Avonmouth feels that their present safety set-up is built on a solid basis, he is far from satisfied. He feels that though it may not appear possible to eliminate accidents completely, continued education in safety methods of working must eventually mean a considerable progressive reduction in lost time accidents, and to that end the company will continue to aim at "1,750 virtual safety officers."



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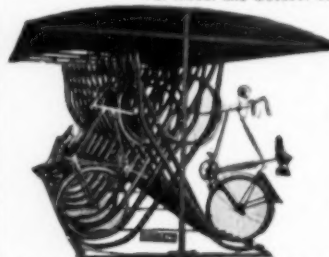
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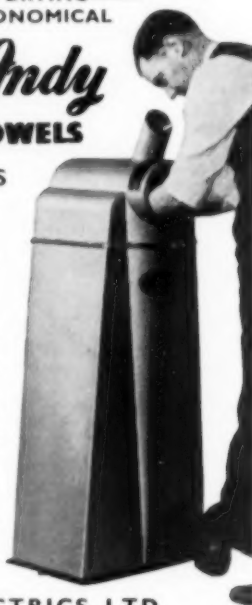
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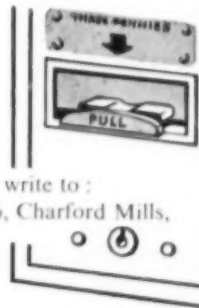
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S.B. 71



## Policy Column

### Canteens at the Crossroads

As soon as one staple food steadies in price and gives hope of lower food percentages, another soars and the narrow, precarious margin of gross profit is wiped out.

Labour costs, too, grow ever higher. The scarcity of suitable canteen assistants who are willing to work harder for less money than in other occupations makes itself more widely felt every day, and fuel, equipment and materials for cleaning add their share to the burden of cost.

Along with these increases in expenditure, many canteens are experiencing a fall in patronage. Spending power, which is not only a matter of how much a man earns but of how many things he wants, never keeps pace with living costs. As a result, more packed meals are carried, more people eat a snack in place of a meal, and more go home to dinner even if the journey is a tiring one. These are not the only reasons why the number of people who use the canteen is falling, however.

Rising prices of food and labour have in many cases forced one economy after another upon the canteen manager. Portions have been cut, recipes impoverished, and service reduced to a minimum. This has happened so gradually—and over so long a time—that monotonous meals and sloppy service have become taken for granted.

What policy, then, should an enterprising canteen manager adopt? Should he move away from the set dinner to hot snacks, soups and sandwiches, as many are doing? Or should the emphasis be on better meals, brighter dining rooms, more efficiently equipped kitchens, higher prices and bigger sales? Very many canteens have chosen this course and, in some cases, have been surprised at their own success.

Then, of course, there is the pessimistic outlook. Economize still further, put away tables and chairs, sell off surplus ranges, cater for those people who can't afford anything better! And from this, it is only a short step to complete defeat. Shut the place down! Have tea stations and mess-rooms and spend what used to be the canteen subsidy on something from which a bigger percentage of employees would benefit.

These then are the alternatives. It is up to each firm, in the light of its past experiences and its hopes for the future, to choose one course—and stick to it.

## Modern Methods Speed U.S. Canteen Service

By WINIFRED McCULLOUGH

*Senior Canteens Adviser, Industrial Welfare Society*

It is only to be expected that America—birthplace of so many labour-saving devices—should also be the home of the most efficiently-run industrial canteens in the world. Some of the methods and gadgets used in these canteens are described in this article, which is based on the author's recent tour of the U.S.A.

THE employee cafeteria is very much on the upgrade in America. Whereas British canteens were mostly established in war conditions, in the States places for people to eat while at work are being built and equipped for customers with plenty of money to spend.

Recently, the National Industrial Conference Board asked 138 U.S. companies to give the reasons why they had an employee cafeteria. An analysis of the replies shows that four main advantages were listed:

They improve worker/employer relations—65 per cent

They improve workers' health—35 per cent

They increase production—26 per cent

They help reduce absenteeism—18 per cent

All agreed that cafeterias help good timekeeping.

**Dining Rooms.** Dining rooms are lighter, brighter, more imaginative than most of ours. They are not luxurious, however, and no one worries about dignity or good taste. Artificial flowers brighter than nature ever painted grow on window-sills and trail up trellised walls. Big rooms are broken by pillars, screens and half walls into more homely units. Out of any 50 tables, some will be round, some square, some long and narrow. Tables for six accommo-

date sociable parties. Tiny tables for one let the solitary eater prop up his paper in peace. Chairs are comfortable, floors colourful, and—very important—lighting is first class. Most dining rooms and serveries are lit so brightly that one feels "foot candles" are altogether too pedestrian and dim a measurement.

One dining room often serves everyone from president to porter. The company's guests sit down at table and their guide takes his turn in the cafeteria line and brings back their lunch with his own.

**Kitchens.** Although kitchens, on the whole, are smaller than ours, they are equipped with every labour-saving device we know of—and some we don't. For example, practically every works kitchen in the States has some or all of the following:

*Electric graters and dicers, and vegetable choppers.* With interchangeable plates to give variety of shape and size.

*Electric fish scaler.* Operated by running the scaler over the fish.

*Hamburger maker.* Mixes ingredients and shapes into patty form ready for cooking on the griddle.

*Cake and pastry ovens* of a rotating type. These save the space occupied by a travelling unit.

*Machines for automatic brewing of coffee.*

*A steak tenderizer which mechanically treats less choice meat so that it can be grilled and made tender enough to "eat with a fork."*

*Dish washers:* Completely automatic with flushing water, stripper, washing tanks and drying chamber.

*Electric pot scourers:* Operator runs power brush over the utensils to be cleaned.

*Electric disposal units:* All the garbage is ground up and removed through the drainage. Some of these are designed to throw out cutlery, etc., which has got in by mistake.

*An electronic device which controls the amount of detergent used in dish washing.*

*Change machines, adding machines, money counters:* Generally used by all cafeteria cashiers.

*Automatic cash registers*

*Holsts, lifts, moving belts, gravity rollers:* Extensively used for moving goods, carrying trays of dirty cutlery from dining room to wash-up, etc.

The layout of the kitchens, too, are differently planned from ours. As more ready-prepared deep freeze and dehydrated foods are used, far more refrigerator space is allowed, although there is less range space. The "old-fashioned" American large-scale kitchen had a cubic foot of refrigerator space; the up-to-date kitchen has two cubic feet (including some deep freeze accommodation) and the kitchens of the future will have even more. Solid-top, general purpose ranges are not markedly different, except that the exteriors are often stainless steel. Much of the food we grill or toast or pan-fry, however, is cooked on the dry-fry plate or "griddle." This immensely thick sheet of metal with heat elements beneath the surface is the focal point of short order cooking. It is often situated behind the counter where, in full view of the customers, eggs, steaks, ham, sausages and hamburgers are quickly cooked to order.

**Staff Training.** Staff training of the general assistant is done on the job, at short refresher courses, at vocational courses and special training kitchens.

Invariably, it is simple, graphic and very thorough. It includes basic jobs like vegetable preparation and dish-washing and teaches every operative to work to a step-by-step plan devised by a methods engineer.

The *spirit* of the job is taught, too. How to look after their own health and

the health of their customers. Simple nutrition so that they will realize the importance of conserving the valuable elements in food. Everything, in fact, is studied, planned and worked out to a formula. Nothing is too low to receive attention at the highest level.

**Points of General Interest.** Employee cafeterias are subsidized there as they are here, but the subsidy is clearly formulated and, on the whole, not exceeded. The subsidy may be expressed as 25 cents from the firm for every dollar spent in the cafeteria or, perhaps, 10 cents a day for every employee on the payroll.

If food costs or wage rates rise, the cafeteria manager consults with the personnel and accounts departments and increases prices accordingly. Very often a sort of "efficiency audit" of the cafeteria is undertaken periodically by a consultant or a committee appointed for the purpose.

There appear to be no regrets about the subsidy—"Cafeterias do more for health than doctors," "Good food keeps people at work and contented," "It's the only rise we can give and know it'll be spent for better health" are just a few of the opinions expressed.

No apologies are made for the works cafeteria, even if it is simple and plain and "rough" by comparison with others. It is accepted for what it is and lunch is offered to a visitor on a paper plate without the least fuss.

Neither is much attention given to customers' complaints. "If they aren't satisfied they'll stay away" seemed to be the general attitude.

On the whole, cafeteria supervisors are well paid, with high status and full backing of the management. Much is expected of them and no excuses are tolerated. In the larger cafeterias the supervisor is usually a man, but he shares his main responsibilities with a woman dietician who plans menus, takes care of the quality of the food and very often acts as staff supervisor.

Less pairs of hands are needed to do jobs than in Britain. An average of one canteen attendant to 50 or 60 meals compares with an average of one to 20 over here. A day comparable to ours is worked with a morning coffee break, a mid-day meal but no afternoon break. Where the factory is on shiftwork there is usually one meal and one coffee break on each shift.

In spite of the greater output due to labour-saving devices, ready-prepared foods and self-service techniques, the wages bill as a percentage of takings is considerably higher than ours. The lowest hourly wage rate encountered

for general canteen assistants was one dollar and a quarter (about 8s. 9d.) an hour. The use of labour is very carefully organized. For a payroll of 40 per cent of the total canteen expenditure, a split-up would work out as follows:

- 12 per cent for the preparation of food
- 12 per cent for sanitation (washing-up, cleaning, etc.)
- 10 per cent for serving the food
- 6 per cent for supervision.

#### **Points Made at a Recent Conference.**

Here are some of the points made at a recent American conference on industrial canteens:

Remember that the shorter the walk the lower the wage bill—have a small kitchen well-planned.

Power is cheaper when it comes through an electric switch. Use push-button methods wherever possible. The most expensive form of labour is human effort.

Make the customer do most of the work. Let him pour his own coffee, help himself to bread, preserves and sauces. Have a moving belt and get customers to eat from trays, put their used trays back on the belt. No table wiping, no table clearing.

Use paper wherever you can. Remember you can't see the bill for goods you don't buy. Spend on paper to save on china breakages, detergents, wages, storage space.

Make use of the law of gravity. Roll china to wash-up, vegetables to kitchen, dirty pots from stove to wash-up.

Spend on equipment, on easy-to-clean surfaces, on labour-saving devices. Don't wonder if you can afford this or that. If it saves money or time, space or effort you can't afford to do without it.

**Basic Differences.** The basic differences then are these. The American industrialist is proud of his canteen and accepts the subsidy. He goes into it with his eyes open and reckons it to be well worth while.

The employee cafeteria has no trace of institutional appearance, in either spirit or menu. It compares in every respect with cafeterias run for profit.

Capital expenditure is higher. Kitchens, servery and dining rooms are easier to work in, quicker to clean, and need less work-hours to achieve the same results.

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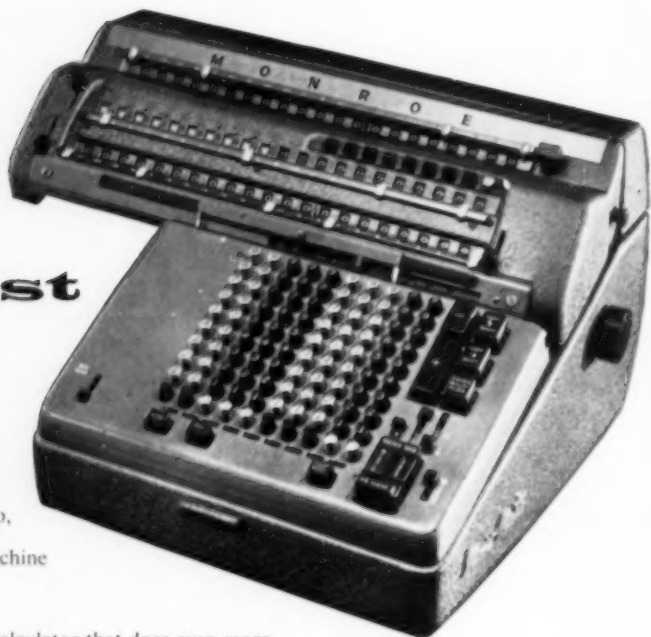
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The surface of the table is 30in. long and 19in. wide, and is made of strong sheet steel, sprayed with beige felt to prevent papers sliding. Two channels are provided near the top for pens and pencils, and there are detachable plastic ashtrays on either side.

Enquiry Ref. No. O.11/2

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Carbons of receipts are gummed on the credit card and totalled up in the same way. To find the "balance due" at any time, the clerk merely has to calculate the difference in the totals of the two cards.

Chief advantages claimed for the system are: (1) the essential equipment is kept at a minimum; (2) the number of documents kept on file is considerably reduced; (3) the danger of transcription errors is eliminated.

Enquiry Ref. No. O.11/3

### Relax While Working

**A** FEATURE of the contemporary-style executive's chair shown below is the raised backrest, which en-



Attractive swivel-chair



High-speed cheque protector

bar, the same amount can be printed any number of times.

The machine is built to stand years of hard wear, and has an attractive silver-grey finish. Maximum capacity is £99,999 19s. 11d.

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### Fireside Desk

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## Business EQUIPMENT SURVEY

ables the occupant to relax while still maintaining a fully upright position. The chair is covered in black-and-white spotted material, and has a sturdy teak base on which the seat can be swivelled round.

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Enquiry Ref. No. O.11/5

### New Calculator Range

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Enquiry Ref. No. O.11/6

### Non-Tear Staple Remover

THE Bates No. 60 staple remover is claimed by the makers to pull out staples of all sizes without tearing the



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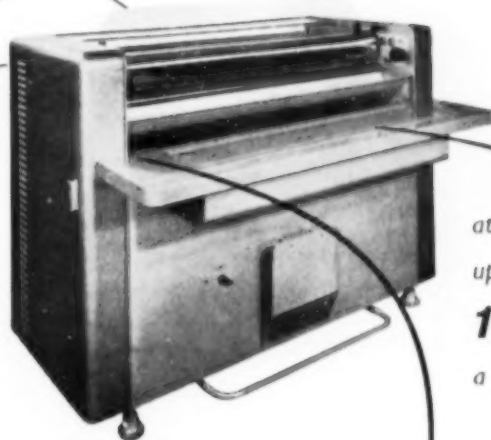


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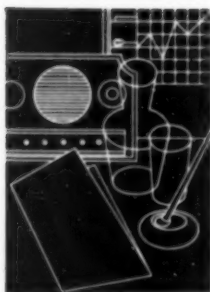
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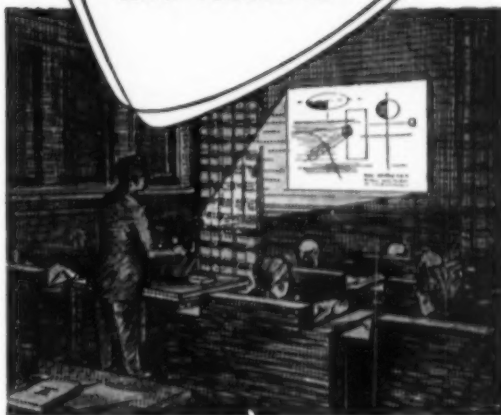
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\* Milners 'Firex' Filing Cabinets are obtainable in 4, 3 and 2 drawer sizes.



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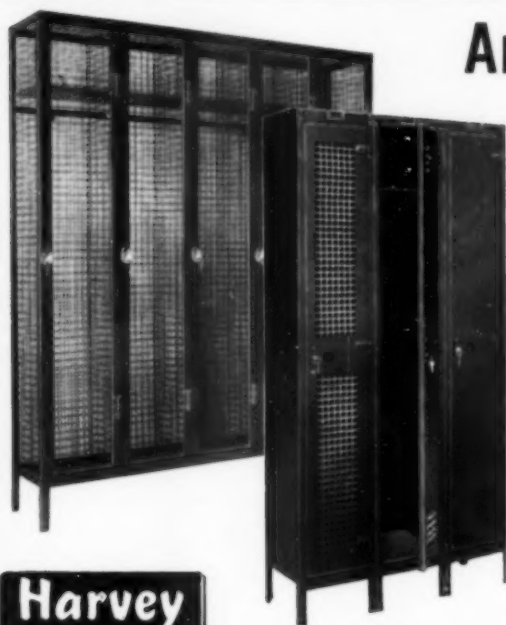
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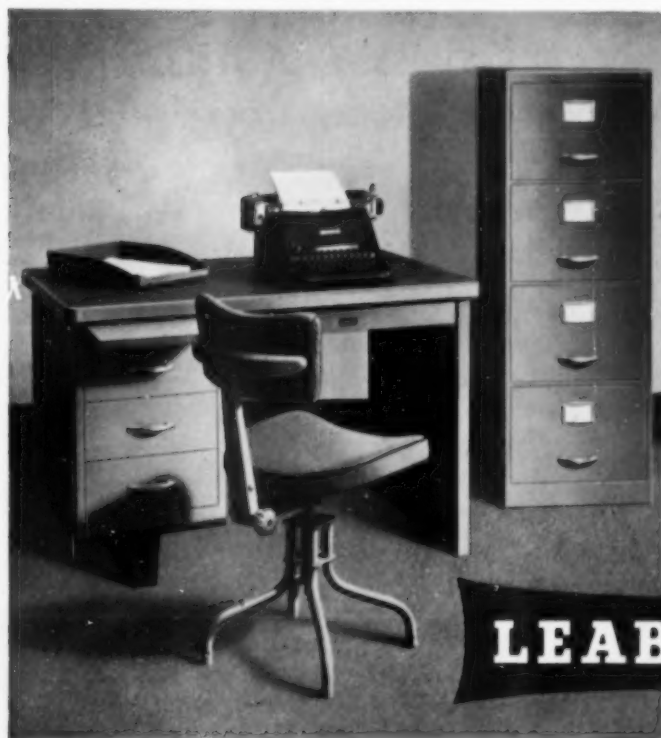
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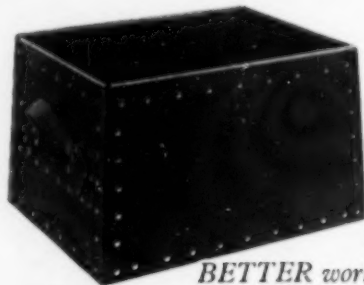
Above is illustrated an ingenious automatic sectional map of Great Britain. A simple movement brings the required section into view. On the right is a glue pen which cleanly and firmly unites paper and documents.



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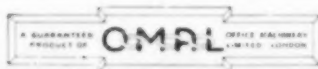


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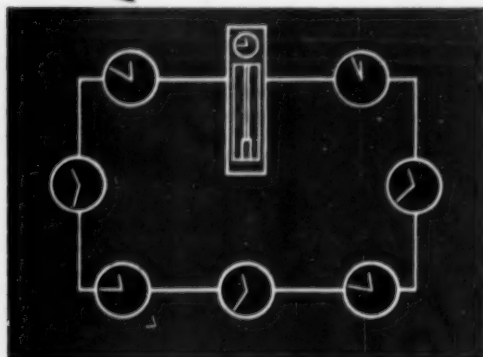
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Royal Diana, with its  
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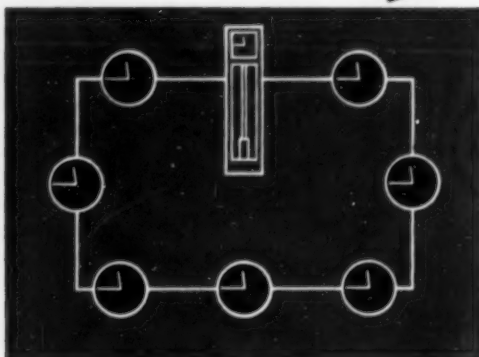
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NOVEMBER, 1955

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Only a simple 2 wire circuit required.

Models to suit all kinds of establishments including offices, works, schools, etc.

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## INDUSTRIAL EQUIPMENT

### HAND TOOLS

#### For Joist Boring

**B**ORING holes through joists in almost inaccessible places is an operation which can waste much time. A solution to this problem is provided by the J.E.C. joist boring machine.

A pencil line is drawn along the top of the joist or beam to be bored. The guide bars of the machine are lined up with this line, and the handle is turned. The bit is fed towards the joist, and immediately it starts cutting a self-feeding device comes into operation.

The amount of feed can be regulated and the feed range is approximately 4½ in. Overall length when the unit is closed is 12 in.

Wood-boring bits up to 1½ in. fit directly into the main spindle. A three-jaw chuck can be supplied to take twist drills (for drilling metal) up to



For use in awkward places

¼ in. diameter. For drilling holes up to 2 in. in diameter in steel tanks, a special hole saw and mandrel can be supplied.

Enquiry Ref. No. F.11/1

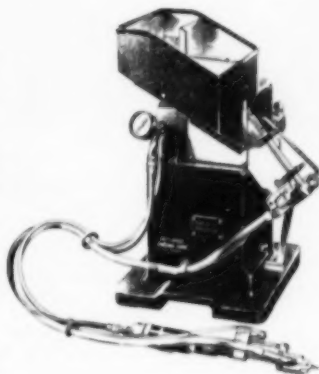
### PORTABLE POWER TOOLS

#### Speedy Screwing

**I**N many mass-production factories, the fixing and driving of screws represent a costly bottleneck. Manufacturers of the *Pneuma-serve* portable, automatic screwdriving unit claim to have solved this problem.

This light-weight unit pneumatically feeds screws from a hopper, through a plastic tube to a delivery head fitting on to any make of power driver. As one screw is driven home, another is instantly positioned ready for driving. The hopper holds enough screws for five to eight hours' work, and the unit will operate from any compressed air system with a pressure of 80 lb. p.s.i.

Advantages claimed for the *Pneuma-*



Saves Labour costs

*serve* are: (a) screws are driven four times faster than manually; (b) the elimination of screw handling reduces the number of assembly pieces handled; (c) production layout can be made more flexible as the driver is taken to the work; and (d) the units can be ganged up on jigs for any multiple simultaneous assembly.

Any standard wood, machine, or self-tapping screw up to 1½ in. long and from 0.10 in. to 0.25 in. diameter, can be handled. Minimum lengths depend on the type of screw, but generally screws greater than 25 per cent longer than the head diameter can be used.

Enquiry Ref. No. F.11/2

### MACHINE TOOLS

#### For the Toolroom

**S**UITABLE for the toolroom and for general production, a new internal grinding machine handles small and medium-sized workpieces, including tungsten carbide dies.

The workhead, which incorporates cross traverse micro-feed, can be swivelled to grind tapered workpieces up to 30 degrees on the standard machine, and up to 120 degrees with a modified workhead. A slide bar in the workhead carries the diamond tool for dressing the grinding wheel, and also acts as a steady for grinding between centres. For wet grinding, a protective cowl is fitted over the chuck and workpiece.

The grinding spindle unit on the grinding carriage can be reversed, thus off-setting the grinding spindle 2½ in., to allow for external grinding in con-



For small and medium-sized work

junction with a support for centred workpieces extending from the slide bar.

A magnetic filter is available for use with the coolant supply, and the coolant tank and pump are housed in a cabinet-stand.

The machine is fitted with automatic reciprocating traverse of the grinding carriage, giving an adjustable stroke of up to 4 in. An alternative hand-operating arrangement is also fitted with an adjustable stop, to determine the forward stroke when the grinding carriage is operated manually. The manual grinding operation allows a grinding length of 6 in.

Enquiry Ref. No. F.11/3

#### Self-Contained Drilling

**B**ECAUSE of its closely-fitted spindle assembly, the *Type 8 M.D.* self-contained drilling machine can be used for producing accurate jig plates and similar work, as well as for light milling operations. The spindle runs in lead bronze bearings and is drilled through



Six working speeds



## Business EQUIPMENT SURVEY

for the draw bar and threaded for collets.

All thrust bearings are fitted to take the working load and six speeds are available from the V belt drive. The machine incorporates a hinged motor plate, with a rapid belt-tension device, and the belt guard lifts for easy access. The cone pulley is supported on internal ball races so that no side stress is imposed on the spindle.

Also fitted is an adjustable feed index collar which continuously indicates the depth of drilling. The quill can be locked in any position. The table, of the rigid, non-tilting type, is fastened to the column with a lever-operated cotter lock and is quite free when released. The column is of solid steel construction and an adjustable spring return to the quill has been used.

Enquiry Ref. No. F.11/4

### PROCESSING

#### Mobile Welding Set

A LARGE number of welding applications are within the capacity of a new trailer-mounted electric arc welding set. Bare or shielded arc type electrodes may be used and hard-facing work can be tackled because the equipment is of the D.C. arc type. The class "B" insulation of the generator



Has many applications

enables it to withstand continuous operation at its highest range, which enables it to weld materials heavier than would normally be handled by a welder of this size.

A "dual continuous control" system permits the exact arc characteristics to be obtained for welding with any particular electrode or on any type of job. It also permits independent adjustment of voltage and current, giving complete and separate control of arc heat and arc penetration. Both controls are self-indicating.

The canopy is of pre-stressed steel, suitably ventilated; a hinged door with a car-type handle and lock gives access to the generator control and the stow-

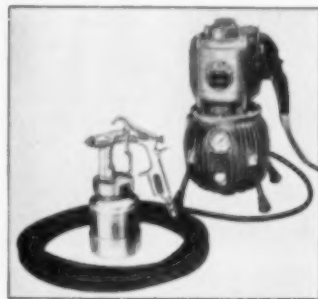
age compartment for welding gear. The three-gallon fuel tank is mounted within the canopy and is accessible for filling via a small hinged door. Overall size is 6ft. from tow bar to rear lamps, 44in. high by 38½in. over mudguards; weight is 630lb.

Enquiry Ref. No. F.11/5

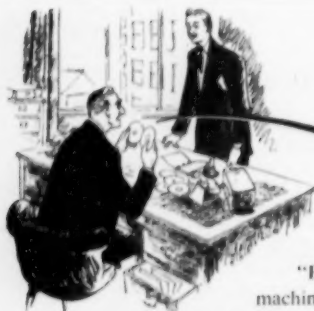
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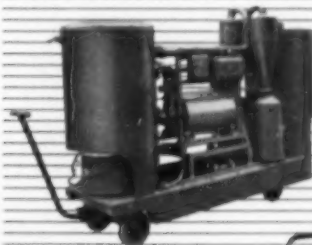
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### MODEL TLI.

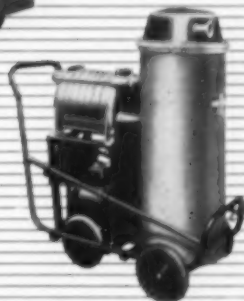
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## Business EQUIPMENT SURVEY

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The compressor, with  $\frac{1}{4}$  h.p. motor, weighs 42lb. An L.800 internal atomisation gun and hose complete the plant.

Enquiry Ref. No. F.11/6

### GENERAL

#### For Soldering and Brazing

**C**LAIMED to be the first bench-type induction heater to be made available in this country, the *Radyne C.21* is for soldering, brazing and heat treatment, and provides a 20:1 variable heat output control. With this control, full heat output is delivered into any heat coil desired, thus making the unit sufficiently versatile for general workshop use.

Ferro-magnetic heat intensifiers can be used for the application of heat to



For bench use

surfaces around which the heating coils cannot be positioned.

A trolley incorporating a water recirculator, and special tubular steel stand are also available.

Enquiry Ref. No. F.11/7

#### Portable Baler

**T**HE *Portabale* hand-operated industrial baler can be used by one unskilled labourer, and can be wheeled to the scrap—thus eliminating the time wasting business of taking the

scrap to the baler.

Its features include a wide-mouthed feeding chute which speeds the loading of even the most difficult materials, and a detachable front which can be used as a trolley for taking the baled scrap to a stacking bay. The photograph shows aluminium trimmings being fed into the baler.

Enquiry Ref. No. F.11/8



Bales most materials

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NOVEMBER, 1955

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## CANTEEN AND WELFARE EQUIPMENT

### Pipe Pump

**C**HOKED waste pipes below sinks or wash-basins can be cleared without prodding or poking, with the



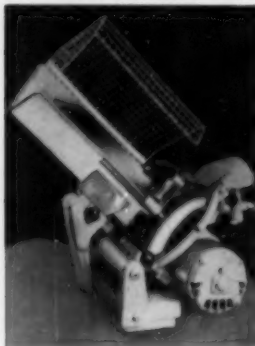
**For blockages**

**Liberator** ball pump. Base of the pump is pushed into the plug-hole, and a few strokes of the pump handle are said to clear any normal blockage. A larger model is made for urinals and small gulley traps.

Enquiry Ref. No. C.11/1

### Safe Slicing

**G**RAVITY feed electric slicers for bread and other foods can now be fitted with a chute hand-guard. A wire mesh cover big enough to fit over a full-sized sandwich loaf is attached to the chute, making it impossible for operators to push loaves down by hand



**No lost fingers**

instead of with the pusher plate. A new type of thickness plate also helps to keep fingers away from the cutting blade.

Enquiry Ref. No. C.11/2

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**V**ELOPA bicycle parking devices can be fitted to walls, posts, railings or self-supporting stands. Bicycles have only to be pushed into the gal-



**Simple and quick**

vanized steel arms of the holders, to be held upright. Serrated insides of the arms grip the tyre without touching any metal part, and the wheel can easily be padlocked to the holder. Ten models for different types of fitting are available, together with complete covered stands made to fit particular parking sites.

Enquiry Ref. No. W.11/1

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## APTITUDES AND ATTITUDES

*Continued from page 80*

value if they ask a lot of questions and produce no positive results.

The surveys can either take the form of interviews by outside bodies, such as the National Institute of Industrial Psychology, or of questionnaires sent out by personnel or training officers. The interview is probably more thorough, and a lot can be learned by getting a man to talk freely. The questionnaire is cheaper and quicker, and may give a greater feeling of anonymity—though one firm found that 85 per cent of those answering put their name on their forms. But it is limited in usefulness by the specific questions asked. There is no possibility of chasing up proper answers to misunderstood questions, by supplementary questions, and the most important questions may not be asked at all. Before sending out a questionnaire it's as well to run a pilot survey, to obtain some indication of what questions should be asked, and how they should be worded.

Because these surveys are largely a

search for the unexpected—management being on the look out for troubles which may exist without their knowledge—many of the most important results come from "open-ended" questions, which simply ask "What do you like best or worst about your job?" It may be, for instance, that, unknown to management, many people feel insecure through a quite groundless fear of redundancy. Fears cannot be proved liars until it is known that they exist.

Otherwise, the main use of the survey is as a "comparative tool." How does one shift compare in satisfaction with another doing the same job? How do workers in different firms of a similar nature compare in attitude? Do women or men have a stronger preference for this or that sort of job? (Some surprising answers to this one have helped to shatter lofty, but factually unsupported reasoning about "natural" preferences.) Are those who have been systematically trained more satisfied than those who learned the hard way? Can anything be learnt about types of people by finding whether people who complain, say, about the canteen tend also to complain about hours of work, and so on?

The training and techniques of the psychologist are most important in framing "neutral" and unambiguous questions, and in analysing the mass of statistics which the surveys produce. It has been found, for instance, that those who say "Yes" to the question "Are you satisfied with . . .?" are not necessarily the same as those who say "No" to the question "Are you dissatisfied with . . .?"

One way of finding out what factors contribute most to general satisfaction, or dissatisfaction, is to divide the workers into three equal groups, (a) the most satisfied generally, (b) the most dissatisfied and (c) the rest. If it is then found, for example, that 60 per cent of (b) and 40 per cent of (a) complain about the canteen, whereas 80 per cent of (b) and only 20 per cent of (a) are bothered by monotony, you have a rough measure showing that boredom is more troublesome than food.

General research into "morale factors" is more difficult to carry out, and its findings more difficult to apply, than research on morale in particular firms. So far, only three general ideas have won wide acceptance:

- (a) The relative unimportance of

*Continued on page 170*

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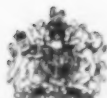
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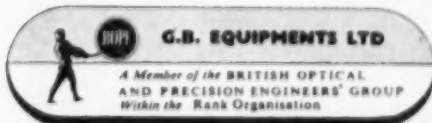
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Reason

pay in contributing to satisfaction with the job, once security is assured.

(b) The great importance of the supervisor's influence.

(c) The effect on morale of "social pressures" within the firm.

The last point has been put to very special use by the Tavistock Institute of Human Relations, notably in their work at the Glacier Metal Co, where they used "interdisciplinary" teams which included psychiatrists, sociologists and anthropologists.

The language of these sciences is not always easy to understand. But the basic idea of this work is simply to apply psychiatric techniques for interpreting and curing emotional difficulties to the idea of "group pressure" produced by the sociologists. That is, instead of seeing individuals as unconsciously motivated by "Oedipus complexes," "mother fixations" and the rest, the psychiatrist sees them as victims of real or imagined public opinion in the works—for example swayed by "unconscious feelings" of pleasure at occupying positions of power, whether as manager or shop-steward, guilt produced by this enjoyment of domination, and so on.

### "Cards on the table"

In practice, the procedure is mainly a matter of "cards-on-the-table." When invited by all parties, the psychiatrist sits in at meetings of workers and management, or representative negotiation and joint consultation bodies. And when asked to do so (generally after a deadlock has been reached) the psychiatrist gives his view in plain language, and in no uncertain terms, of how the speakers are working off their unconscious guilt or fear, instead of behaving as rational and responsible negotiators. He is always careful to avoid giving advice on objectives. His approach is: "If you really want to reach agreement, I will say how I think group pressures are getting in the way." He does not say whether he thinks an agreed decision is what ought to be achieved.

There is a good deal of controversy about this approach. The more orthodox psychologist complains that, unlike his tests of basic capacities, psychiatric theory is completely without validation. It is quite possible to interpret anyone's emotional difficulties in half a dozen different ways. Any theory will "work," be it that of

Freud, Jung or Adler. But how far any particular interpretation is the right one is purely a matter of opinion. The psychiatrist is merely pulling out from the subconscious what he himself has chosen to put in.

The psychiatrist replies that his interpretation is obviously incapable of validation in the statistical sense; it has to be tried out in practice, tested by observation of how far it works, modified if necessary and tried again. The statisticians are not seeing the real man, with all his complicated thoughts and feelings; they may listen to the words, but they are deaf to the music.

### An agreed policy

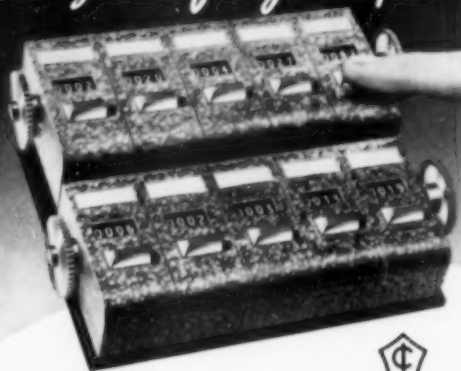
On the one hand, it can be shown that remarkable results have in fact been achieved, particularly at Glacier Metal, where there is now a controlling statement of policy—a constitution for the factory—agreed between management and "members" of the company (employees). It contains such unusual clauses as this: "This policy assumes that shareholders and members individually and collectively want to go to the very limit in trying to work out policies which are acceptable to everyone, and that they are willing to tolerate some shortcomings in policy in order to achieve this end. These assumptions are embodied in the principle that Councils shall pursue their deliberations until they reach unanimous agreement."

The statement contains many other original provisions for the organisation of industrial democracy, and is a model of precise definition of rights, responsibilities and channels of communication.

On the other hand, the experiment undoubtedly raises some anxious questions for industry and politics alike. Just how far can the idea of "unconscious social pressures" be used to explain away the unorthodox, troublesome opinion? How far is the production of "normality" and peace of mind, which is naturally the psychiatrist's objective in his ordinary capacity as a doctor, producing a desire for harmony in the factory at any price? Is the smoothing away of troublesome emotions going to turn us into a people with no emotions at all? When is it a good thing to get angry—guilt feelings or no guilt feelings?

The undoubted achievements at Glacier Metal inevitably invite the challenging, if depressing, question: does it really take a psychiatrist to make industrial democracy work?

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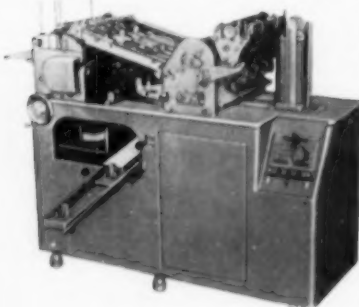
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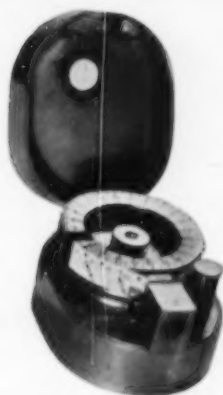


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## ELECTRONICS IN THE OFFICE

*Continued from page 84*

▶ Leo Computers Ltd., Lyons' one-year-old subsidiary, are building *Leo II*, a transportable machine based on the Cadby Hall installation. The first production model will be available next year.

Including a set of reading and recording equipment, the new machine will cost approximately £75,000. The manufacturers say that a *Leo* installation should produce a net saving in clerical costs of at least £100,000 a year—considerably more in some circumstances.

▶ The Plessey Company Ltd. are developing a series of small, relatively inexpensive computers for commercial and scientific purposes. The first machine, the *P.E.P.* (Plessey Electronic Payroll) is already taking over some of the office work at their Ilford factory.

Despite its name, the *P.E.P.* is capable of undertaking many types of commercial work. For Plessey, it is producing the Ilford payroll (approximately 10,000 people on piecework, hourly, weekly or monthly rates), labour costing and allied statistics. When this work is taken over completely, the *P.E.P.* will be only half-occupied, but the savings are expected to cover the cost of the machine within the first year.

▶ Powers-Samas Accounting Machines Ltd. introduced their £13,000 *Programmed Controlled Computer* at the Business Efficiency Exhibition this year, and the machine's main features were described in the June issue of *BUSINESS* (page 222).

The first *P.C.C.* will be installed next Spring in Paris; the second is to be employed by British Railways on gross pay calculations (using mark-sensed cards, bearing minimal data, as the input media). During the remainder of 1956, it is possible that another dozen of these machines will be delivered to users in Britain, Australia and South Africa, and, in fact, the whole output for the next two years is already sold. Apart from payroll computations, the initial applications will include work scheduling, stores accounting and production control.

Powers-Samas are organizing a series of two-week training courses for users' and potential users' personnel. They themselves are prepared to provide ready-made programmes, but the aim is to make users "self-supporting" as quickly as possible.

The *P.C.C.* is a punched card

**BUSINESS**

machine which can be assimilated into any Powers-Samas system. Normally operating at a speed of 7,200 cards per hour, it performs complete routines on its own "initiative." One of its unusual features is the "fixed card" method of programming. Four special cards are placed in a stationary unit where they are sensed continuously while the routine is being carried out. Each card holds 40 instructions, so a set provides 160 basic steps; moreover, the machine incorporates a number of "built in" sub-routines which can be used over and over again as required.

The P.C.C. is a logical development of the *Emp* electronic multiplying punch which has been on the market for about four years (typical applications: stores accounting for British Railways Western Region, and pricing time sheets, haulage, plant charges and stores notes for Woolwich Borough Council). Although designed for business operations, the P.C.C. can in fact undertake a variety of scientific and statistical applications.

► Electronic machines and systems manufactured by Remington Rand in the U.S.A. are coming within the reach of European firms. A series of training courses in *Univac* computing techniques is to be held shortly at Amsterdam. It will follow the American pattern—providing separate courses for management, for programmers (basic and advanced), and for maintenance engineers. Representatives of a number of British firms will attend.

In the new year, a *Univac* computing centre will be established at Frankfurt, Germany. It is almost certain, moreover, that British firms will soon have the opportunity of purchasing or renting the company's data-processing equipment, including the *File Computer*, the *Univac 120* and *60* (both punched card calculators with limited programming facilities) and a new tabulating calculator.

► At the moment none of the other British firms whose American associates are producing electronic computers has announced definite plans for marketing this equipment here. New developments are expected, however, and these will be reported in *BUSINESS* as soon as information is available.

### Computing Services

SOME of the new general-purpose computing systems are economically within the reach of averaged-sized organizations. Nevertheless it will be a long time before they are being used—even by large companies—in more



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than "penny numbers," and many businessmen feel that much of the initial development of electronic data-processing will take place in the shape of computing services.

Facilities of this sort have been available in the U.S.A. for about three years. Remington Rand have a (comparatively) old-established computing centre in New York. Although much of its work involves one-time and unusual jobs, like linear programming, engineering problems and market research studies, it is also handling the payrolls of a few firms.

If a client uses a punched card accounting system, the cards are converted at the centre into magnetic tapes. Alternatively, a client may prepare his own input tapes on a *Unityper*. In either case, the "record data" reels of tape are held at the centre.

Last year I.B.M. set up a computing service at their New York offices. Here, too, the accent is on one-time jobs, although all types are accepted.

Reprints of this article are available free of charge—for full details see page 83

A Burroughs Udec computer is used at a community-sponsored computation laboratory at Wayne University, Detroit.

Similar developments are taking place in Britain. Leo has undertaken work for a number of organizations, including The Inland Revenue, the Institute of Actuaries, aircraft manufacturers, an assurance company and a firm of stockbrokers. In the early days, Lyons charged a flat rate of £75 per computer hour, but they now find that it is better to assess the charges individually in the light of the amount of preparatory work involved.

English Electric will hire-out *Deuce* computers. Ferranti intend that their computing service should undertake commercial as well as scientific work, and are installing a *Pegasus* computer for this purpose. Elliott Brothers have been running a service for nearly three years, using two *402s* and an early laboratory-built machine, and this is to be extended soon by the introduction of a *405* business computing system.

In time, even the smaller firms may be able to pass much of their routine work to centres of this type. Moreover, they may then have opportunities of undertaking statistical studies and other one-time jobs which, at present, are out of their reach.

BUSINESS

## HIS POLICY WAS 'NEVER TAKE NO FOR AN ANSWER'

*Continued from page 97*

virtue of his own workshop experience under much worse conditions than prevail today, and he is in fact genuinely proud of this background. For many years the company have provided first-class social and recreational facilities. Every year, all employees and their families are invited to a garden party at Mr. Howlett's country house.

### *Working Directors*

The value of engineers in the board-room, and the relative value of accountants, is a subject on which Mr. Howlett holds strong views. ("Whoever heard of an accountant developing anything?" he asks). His attitude in this respect is reflected in the composition of Wellworthy's own board: all directors are working directors and all but two of them are technicians.

Members of the board keep closely in touch with each other's activities by attending daily "board meetings"—an unusual practice which, Mr. Howlett believes, gives the company's top level administration a liveliness and broadness of vision unattainable where contact is less frequent. Production methods, personnel problems, advertising appropriations and other matters of policy are discussed formally or informally (as the occasion demands) over afternoon tea.

John Howlett still spends much of his time at the works. But he is also a man with many outside interests. In recent years, he has developed an interest in agriculture and he now farms 700 acres in the Lymington area. His other recreations include shooting and fishing.

Too old at 72? John Howlett raises—and answers—the question himself. "Some people think that a man should retire when he reaches my age, but (pause) surely it depends on the man.

"Anyway," he adds, "we've a strong team here and the company's quite capable of running itself." He emphasizes his good fortune (although one doubts that it is entirely a matter of fortune) of having a first-class team of directors, most of whom, like himself, have come up the hard way—from the shop floor.

When a man has built up an organization of this size from practically nothing, its ability to run itself is, perhaps, one of the finest of his administrative achievements.

NOVEMBER, 1955



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#### **SPECIALITY SALESMEN.**

*Continued from page 101*

would receive expert reasons why they were necessary, and more often than not an enquiry for a price, with the possibility of a sale. Not to be wondered at really, because I had deliberately picked out a butcher who had no "freezer."

Experience cannot be bought or taught. It must be learned the hard way. So I believe in sending out new salesmen as soon as they have been properly grounded in the product. But they come back into the office for one day a week to have their work analysed. On these days we go over the work they have done on the road in the past week—the refusals they have had, the mistakes they have committed and the progress they have made. This helps me too—for many a new salesman has thought of a better way of combating an old objection.

#### **Make Them Happy**

Any type of selling is a tough job, and I believe that the whole of a salesman's energies must be devoted to selling. Therefore I try to make my salesmen happy and contented, driving only those that are doing well and helping those that are doing badly. The former, being on top of the world, are well able to take criticism, and in fact benefit from it. The latter need help to enable them to lose that desperate feeling known so well to speciality salesmen who are short of orders.

My salesmen are provided with cars by the company, and I feel that this policy has much to recommend it. The provision of a car takes a tremendous load off a salesman's mind. Although he may not take home as much money as the man with a car of his own, there is not the nagging fear that one day his car will break down and jeopardize his livelihood. Nor does he have to worry when tax and insurance time comes around.

I find it important to keep the salesmen closely knit together as a team, and I do not hesitate to give them our weekly figures, so that all of them share in the credit of the particular branch of the company where they are employed. Although individual figures are given, emphasis is on the total, and on whether our particular quota (which I set) has been achieved. Thus, every salesman, whether his share is large or small, feels he has helped towards a job of work well done.



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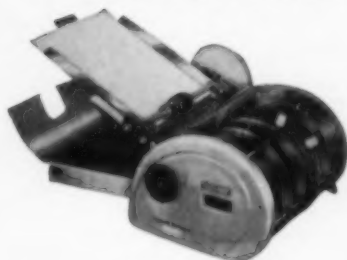


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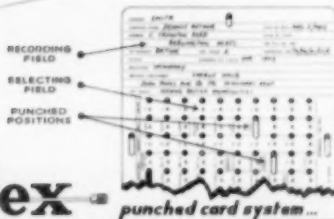
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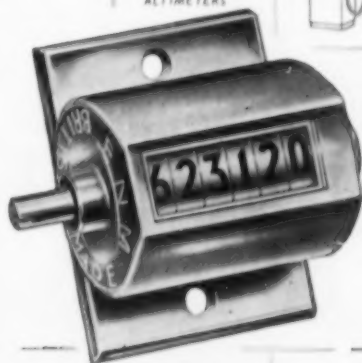


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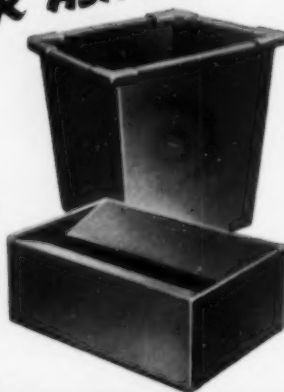
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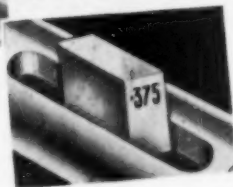


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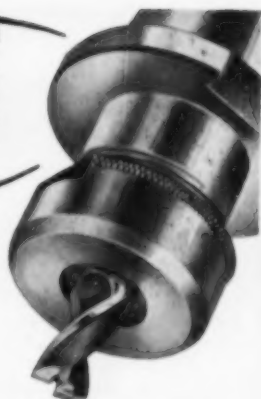


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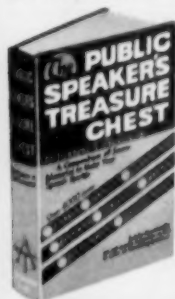
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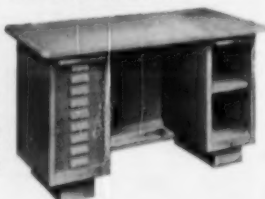
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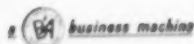


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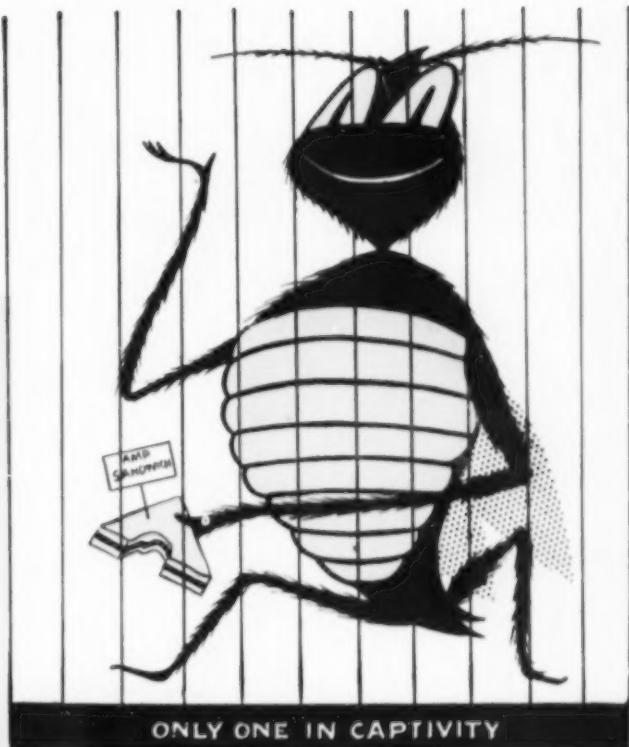
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